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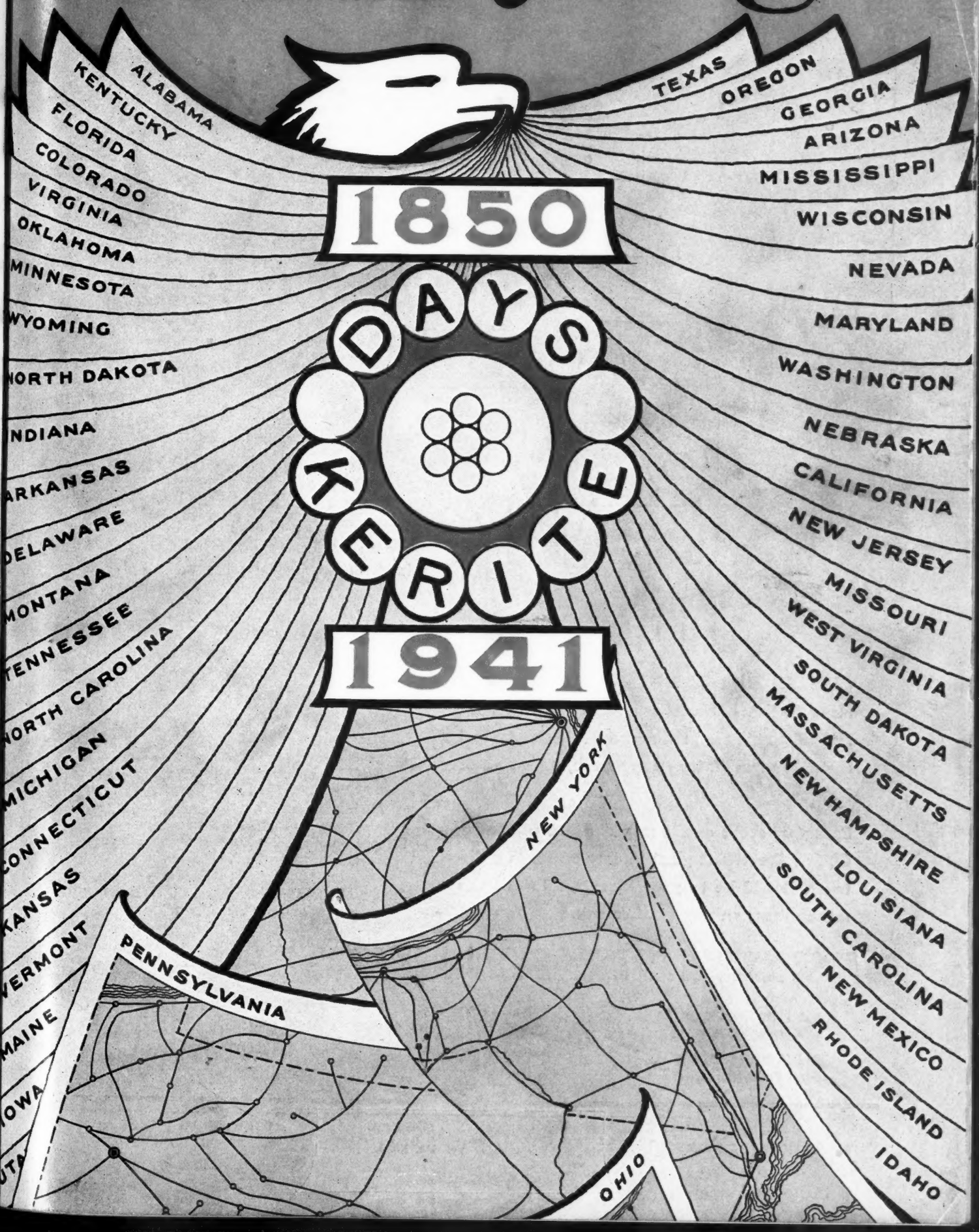

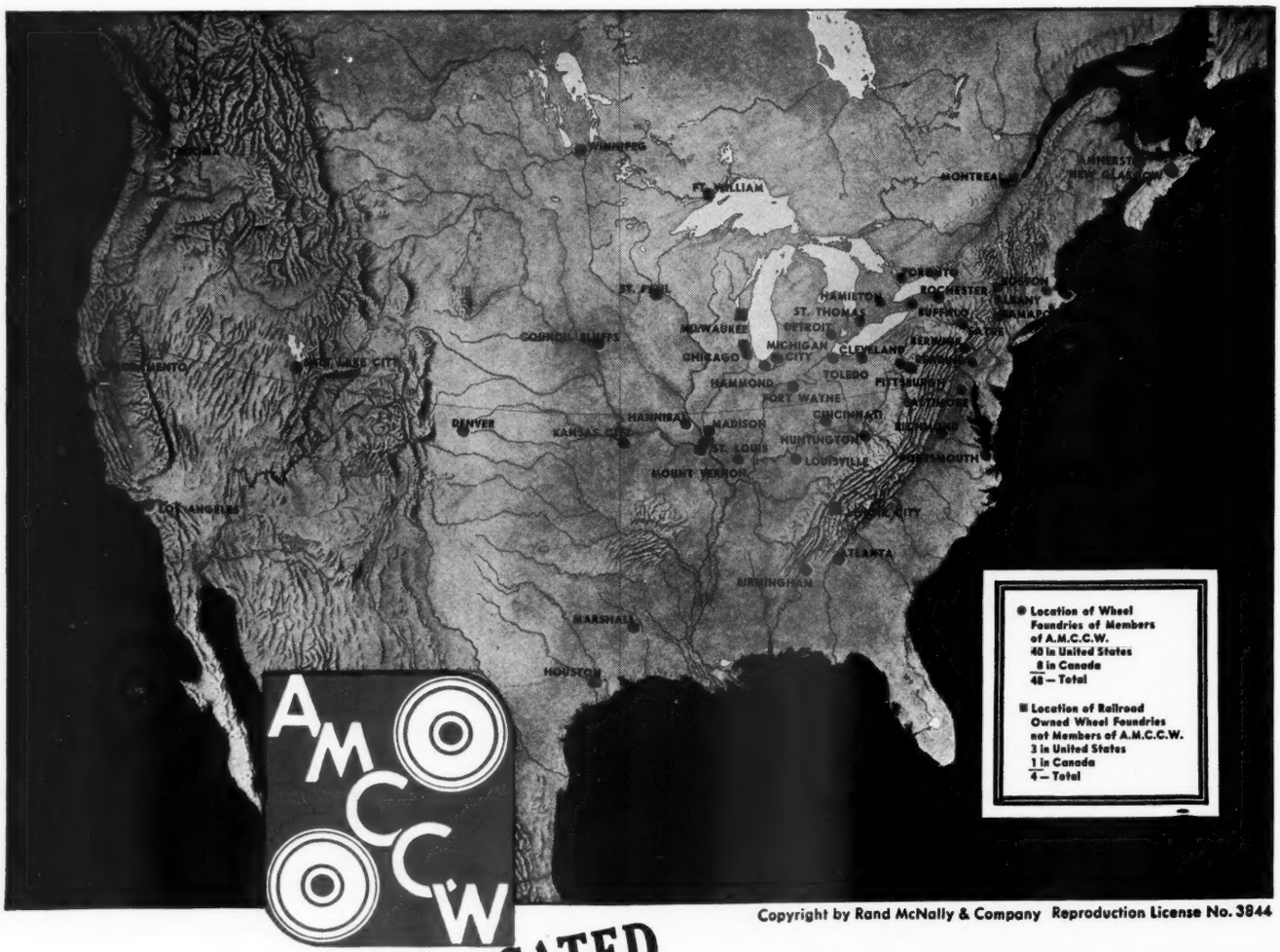

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RAILWAY AGE

1940—Review and Outlook—1941

The year 1940 was definitely one of progress in the railroad industry and in the manufacturing industry that supplies it; and the year 1941 promises to be one of continued progress, larger business and better financial results for both of them—if this country does not become involved in war. That big "if" is now in everybody's mind, is used in every intelligently-made business forecast, and should be considered as a qualifying part of every forecast appearing in this issue of the *Railway Age.*

The railways in 1940 had the largest gross earnings (total operating revenues) since 1930 due to the fact that their freight business was the largest since then, and their passenger business also the largest since 1930 with the probable exception of 1937. On the other hand, operating expenses apparently were less than in either 1931 or 1937, although larger than in other years since 1930. Consequently, net operating revenue (the difference between gross earnings and operating expenses) was the largest since 1930, and the ratio of total expenses to gross earnings (72.28) the lowest since 1929.

The Tax Collector Breaks All Records

But the more efficiently the management of any business does its work now the larger is the "take" that the tax gatherer grabs; and taxes of about 405 million dollars last year exceeded the previous all-time "high" of 1929 by a considerable margin. The outcome, according to the estimate of Dr. Parmelee, director of the Bureau of Railway Economics, (with figures for November and December unavailable), was a net operating income of only about 650 million dollars, or slightly less than in 1936, although exceeding that of all other years since 1930. However, this paper ventures to hope in view of the trend of freight business in November and December that Dr. Parmelee's estimate will prove too conservative, and that last year's net operating income will be found, when complete figures for 1940 are available, to have reached 670 million and exceeded that of any other year since 1930.

The increase of net operating income—which rose some 10 per cent over 1939—was, as usual, accompanied by an increase in railway buying. Total purchases of equipment and materials by all U. S. railways and private car lines, as reported in an article elsewhere in this issue of the *Railway Age,* increased from about 745 million dollars in 1939 to almost 870 million dollars in 1940. We have begun only within recent years compiling figures regarding purchases which include those of the Classes II and III railways and the private car lines; and therefore practically all the other data given in this editorial are for Class I railways only.

Expenditures for Equipment Largest Since 1930

Purchases of equipment and materials by the Class I roads last year are estimated elsewhere in this issue at 822 million 500 thousand dollars, or over 17 per cent more than in 1939, and exceeded those of any year since 1929 excepting 1930, when they were 874 million, and 1937, when they were 853 million. And, significantly the 234 million dollars of orders for equipment placed with the manufacturers in 1940 were the largest such orders placed with them in any year since 1929 (when they were 397 million), the nearest approach having been almost 223 million in 1936. Buying of materials last year amounting to 589 million dollars compared with 992 million in 1929; with 727 million in 1930; with 679 million in 1937, and with 556 million in 1936.

In the ten depression years ending with 1939 total purchases of equipment and materials by the Class I roads averaged 552 million dollars annually, and purchases of equipment alone almost 95 million annually, or 17 per cent of the total. Total purchases of both equipment and materials of almost 823 million last year exceeded this ten-year average by almost 49 per cent; while last year's equipment orders of almost 234 million exceeded the average of the previous ten years by 146 per cent and represented 28½ per cent of last year's total purchases of both equipment and materials.

Two-Year Orders 1936-1937 and 1939-1940 Compared

It is significantly indicative of the situation with which the railways are confronted, and what they are

disposed to do about it, that not only were the orders for equipment last year the largest in any year since 1929, but also that in the two years 1939 and 1940 combined their orders for equipment involved more expenditure than those made in any other consecutive two years since 1929. The orders placed with manufacturers for equipment in 1936 and 1937—when they were the largest in any previous consecutive two years of the depression—amounted to 396 million dollars, while in 1939 and 1940 combined they amounted to almost 433 million dollars. The foregoing figures do not include equipment ordered to be built in railway company shops. Orders for equipment (including that to be built in company shops) were: Locomotives—1936, 533; 1937, 368; two-year total, 901; 1939, 373; 1940, 694, two-year total, 1,067. Freight cars—1936, 70,842; 1937, 49,331; two-year total, 120,173; 1939, 54,431; 1940, 64,881; two-year total, 119,312. Passenger-train cars—1936, 425; 1937, 679; two-year total, 1,104; 1939, 320; 1940, 284; two-year total, 604.

The placing of orders for locomotives in these two years exceeding, and for freight cars approximately the same as those placed in the largest previous two consecutive years since 1929, is in recognition of a fact regarding the railway situation of which every informed person is aware—viz., the railways have ample track and yard capacity to cope with any probable total traffic, and if there should be any shortage of means of handling total traffic it would be a shortage of freight equipment.

The "Downs" and "Ups" of the Depression

We publish in a table herewith some statistics for the years 1928, 1932, 1936 and 1940 that clearly reflect the great changes that have occurred in the railroad industry during the depression. Those for 1928 and 1932 show the terrific declines in traffic and earnings that had occurred when the bottom of the depression was reached and the drastic retrenchments that had been made by railway management in efforts to save virtually the entire industry from becoming bankrupt. Comparison of the figures for 1932, 1936 and 1940 discloses the measure of recovery that has occurred in the industry—and also to the eye of the student several important reasons why its recovery is still so tragically incomplete.

The railways lost 3 billion dollars, or almost one-half, of their annual gross earnings between 1928 and 1932; and had recovered less than a billion of them in 1936. They reduced their annual operating expenses about 2 billion between 1928 and 1932; and had increased them only one-half billion in 1936—with the result that their ratio of operating expenses to gross earnings, which increased from 72.45 per cent in 1928 to 76.87 in 1932, had been reduced again to 72.33 in 1936. Net operating income (net after operating expenses and taxes) declined from 1 billion 173 million in 1928 to 326 million in 1932; and had increased to only 667 million in 1936. Income after fixed charges in 1928 was 787 million; and in 1936 was still only 165 million.

These figures depict an industry which had suffered, and in 1936 was still suffering, terribly, but which had had strong and skillful management and was ready to accomplish its recovery without needing to ask any aid from outside sources provided improved business afforded the opportunity, and its own efforts to accomplish its recovery were not nullified by interference from outside sources. It obviously was not an industry

The Railway "Downs" and "Ups" of the Depression

	1928	1932	1936	1940(*)
Total Operating Revenues	$6,110,156,615	$3,125,732,736	$4,052,734,139	$4,275,000,000
Total Operating Expenses	4,427,995,036	2,403,444,895	2,931,425,066	3,090,000,000
M. of W. and Struct.	837,905,747	351,179,041	454,810,166	500,000,000
Maintenance of Equip.	1,166,941,920	618,940,773	782,999,586	817,000,000
Traffic	125,007,867	96,222,857	100,128,427	108,000,000
Transportation	2,069,927,168	1,157,774,414	1,405,456,665	1,500,000,000
General	188,190,714	155,568,422	157,280,589	130,000,000
All Other	40,021,620	23,759,388	30,749,623	35,000,000
Operating Ratio	72.45	76.87	72.33	72.28
Net Operating Revenue	1,682,161,579	722,287,841	1,121,309,083	1,185,000,000
Taxes	389,432,415	275,135,399	319,752,721	405,000,000
Ordinary	389,432,415	275,135,399	319,752,721	288,000,000
Payroll	None	None	None	117,000,000
Operating Income	1,292,729,164	447,152,442	801,556,362	780,000,000
Equipment Rents	Dr. 92,514,337	Dr. 85,101,947	Dr. 94,458,033	} 130,000,000
Joint Facility Rents	Dr. 27,350,727	Dr. 35,752,487	Dr. 39,751,214	}
Net Ry. Oper. Income	1,172,864,100	326,298,008	667,347,115	650,000,000
Net Income after fixed charges	786,823,584	Def. 139,203,821	164,630,041	155,000,000
Revenue carloadings	51,589,887	28,179,952	36,109,112	36,350,000
Revenue ton-miles	432,915,184,526	233,977,008,859	339,245,826,000	370,000,000,000
Revenue passenger-miles	31,601,341,798	16,971,044,205	22,421,009,033	23,700,000,000
Average number of employees	1,656,411	1,031,703	1,065,624	1,026,000
Total payroll	$2,826,590,471	$1,512,816,147	$1,848,635,804	$1,950,000,000
Average compensation per hr.	65.5c	63.6c	69.1c	75.0c
Average comp. per annum	$1,706.45	$1,466.33	$1,734.79	$1,900.00
Freight train speed	12.9	15.5	15.8	(†)16.7
Freight cars per train	47.1	43.8	45.8	(†)49.7
Net tons per train	792	663	774	(†)850
Gr. ton-mi. per frt. train-hour	23,600	26,046	29,200	(†)33,856
Net ton-mi. per frt. train hour	10,183	10,265	12,146	(†)14,060
Lbs. of fuel consumed by road locomotives: (Frt. Service)				
Per 1000 GTM Inc. Loco. & Tend.	127	123	119	(†)111
Per Passgr. Train car-mile	15.0	14.9	15.3	(†)14.9

(*) Statistics for 1940 are estimates made by Bureau of Railway Economics, unless otherwise stated.
(†) Actual results for the first ten months of the year.

in condition to continue its recovery if subjected to continuance of depression and every form of unfair competition, and to additional heavy burdens.

Political and Labor Influences, 1936-1940

The labor union leaders and politicians in Washington and elsewhere either didn't perceive this or didn't care. Although the industry already was paying the highest wages in history, advances were made in them both before and after the beginning of the sharp recession in business which started in the summer of 1937. Being very hard hit by the recession, the railways in 1938 sought a reduction of wages which was prevented by the influence of the administration at Washington. The result was that in 1938 the net operating income and "other income" of the railroad industry provided it with the smallest amount of "total income" available for meeting its fixed charges in any year of the depression—23 million less than in 1932 and 170 million less than in 1933.

Fortunately, general business and traffic improved in 1939, and again in 1940, and increases in the efficiency of operation continued, with the result that the ratio of operating expenses to gross earnings was reduced from 74.87 in 1937 and 76.35 in 1938 to 73.05 in 1939 and 72.28 in 1940—the latter actually lower than the ratio for 1928 in spite of the great difference in gross earnings. Here, however, as already remarked, we encounter the tax gatherer. Taxes declined from almost 390 million in 1928 to 275 million in 1932; increased to 320 million in 1936; and then they rocketed, as already stated, to 405 million in 1940.

It is worth while to take a second look at these tax figures. Those for 1928, 1932 and 1936 are for "ordinary" taxes only; and "ordinary" taxes estimated at 288 million in 1940 were less than in 1936 and not much larger than in 1932. But because of legislation enacted meantime there is now in addition to "ordinary" taxes an item of payroll taxes which first appeared in 1937 and which is estimated as having been 117 million dollars in 1940.

Is Railway Industry "On Its Way?"

The result of the advances in wages, taxes and other costs was that the increase of about 223 million dollars in gross earnings in 1940 over 1936 was, according to Dr. Parmelee's estimates, more than offset by an increase of 244 million in operating expenses and taxes, causing a decline of about 17 million dollars in net operating income. Furthermore, while fixed charges have been reduced, "other income" declined still more, with the result that income after fixed charges in 1940 is estimated at only 155 million dollars—10 million less than in 1936 and about 632 million, or 80 per cent less, than in 1928.

An industry whose gross earnings and operating expenses last year were 30 per cent less, its net earnings (after taxes) 45 per cent less, and its net income (after fixed charges) 80 per cent less than twelve years before can hardly be said to have recovered, or even to have advanced far toward recovery. Is it, then, on its way toward recovery? We will know better the answer to that question when we know whether, during the years immediately ahead, it is going to be subjected to such influences as it was after its arrival at the peak of its depression "prosperity" in 1936—advances in wages, "recession" in general business and traffic, increase of taxes, or to the perhaps worse influence of war.

Prospective Defense Expenditures and Traffic

With the great increase in government spending for defense occurring, every industry must expect a continuing increase in its taxes. But the railroads are one of the industries that may confidently expect to benefit, temporarily at least, in increased business by the increased government expenditures for defense. These expenditures are made principally for durable goods and the raw materials thereof. The railways, being the great mass transporters, carry relatively a much larger proportion of durable goods and their raw materials, and a smaller proportion of consumers' goods, than other carriers excepting those by deep water; and therefore will benefit more than other carriers by the defense traffic.

The increase of general business and traffic during the last two years has been mainly due to natural causes, although partly to war buying from abroad and in much smaller measure thus far to buying by our own government for defense. It seems not unreasonable to assume that this natural improvement in business will be supplemented and supported, temporarily at least, by the great increase in buying for defense by our own government, and that consequently railway gross and net earnings, and also railway buying from the manufacturing industry, will continue their increase in 1941.

Net Earnings and Buying in 1941

In view of experience during the depression years and the trends prevailing at the end of 1940 an estimate that the freight traffic and gross earnings of the railways will increase 10 per cent in 1941 over 1940 seems reasonable. On this basis the increase in gross earnings would be about 425 million dollars; and if 40 per cent of this should be added to net—a not unreasonable estimate—the increase in net operating income would be about 170 million dollars. This would make net operating income in 1941 approximately 840 million dollars, or the largest since 1930 when it was 869 million. The upward trend of purchases prevailing in 1936 continued in 1937 long enough to make them the largest in that year since 1930 in spite of the fact that in the latter part of 1937 net earnings sharply declined; and the upward trend of purchases prevailing in 1940 seems certain, in view of existing and prospective conditions, to continue in 1941 even more strongly than

in 1937 if net earnings continue to increase. Purchases of equipment and materials rose to a depression peak in 1937 of 871 million dollars; and, in view of present trends, it seems likely that in 1941 they will exceed 1 billion dollars and may exceed 1 billion 100 million dollars.

The Contribution of Increased Efficiency

Of course, these estimates are based on certain optimistic assumptions—such as that not only will general business and traffic continue to expand, but that there will be no advances in railway wages or substantial advances in prices, that there will be continuance of increase in the efficiency of operation, and that there will be no legislative or other action needlessly and unwarrantably increasing operating costs. We know there is risk in making these assumptions. For example, it has been reliably reported that the transportation brotherhoods will seek legislation at the next session of Congress to impose maximum limitations upon the length of freight trains which would require reduction to 70 cars of all the numerous present trains exceeding that length.

We have included in the table herewith figures throwing light on the increases in efficiency of operation, and, especially, of freight train operation, that have occurred during and in spite of the depression. The increases in efficiency shown are especially significant because of a kind far more difficult to accomplish during a period of declining or subnormal traffic such as the last decade than during a period of large and increasing traffic. The average number of cars per freight train declined from 47 in 1928 to less than 44 in 1932, and then increased until it reached almost 50 in 1940. The number of tons of freight per train declined from 792 in 1928 to 663 in 1932, and then increased to 850 in 1940. The average speed of freight trains steadily increased throughout the period from an average of 12.9 miles an hour in 1928 to an average of 16.7 in 1940. In consequence, average net ton-miles per freight train hour (the average number of tons of actual *freight* moved one mile hourly per train) increased from 10,183 in 1928, to 10,265 in 1932, to 12,146 in 1936 and to 14,060 in 1940—that is, 40 per cent between 1928 and 1940. It was principally this great increase in efficiency in train service which made it possible for the railways to spend as little as 72.28 cents out of each dollar of their gross earnings in operating and maintaining their properties in 1940, as compared with 72.45 cents in 1928 when their gross earnings were 43 per cent larger.

Will Train Limit Legislation Be Demanded?

It is needless to tell any student of the economics of railway operation that the passage of legislation limiting the length of trains to 70 cars would virtually nullify all the increases in efficiency and economy of operation that have been made, not only since 1928, but since many years before that. The proposed legislation is pretendedly advocated to increase safety of operation. It would, in fact, greatly reduce the safety of operation; and its true purpose is to increase the number of men required to operate trains, wholly regardless of its tendencies to force reduction of the number of persons employed in other branches of railway service and to reduce the efficiency of railway operation while greatly increasing its cost.

It would seem that if there ever was a time when the railway labor leaders should not welcome, and railway managements should welcome, a struggle over train-limit legislation it would be during the next session of Congress. If ever there was or would be a time when the public could be convinced that the labor unions were promoting such legislation in complete disregard and defiance of the needs of the nation it would be, it would seem, during a time when the nation is engaged in herculean expenditures and efforts to increase its production to provide for national defense.

The Real Danger—Class Warfare

However, the fact that the demand for such legislation is even being considered at a time when railway net earnings are still entirely inadequate and the nation is demanding the utmost efficiency in the conduct of its industries, illustrates the kind of period in which we are living. The future of the world never looked so dark. The immediate future of the United States looks much brighter—in fact, brighter than for a decade. But the future of the United States will be determined by the people of this country **themselves,** and by the way in which they study, and think, and work, and co-operate to promote their mutual interest. Russia, Italy and Germany are ruled by the lowest and most murderous dictatorships the world ever saw, principally because the people of those countries engaged in class warfare. The people of France are lying prone, thirsty and hungry under the heel of the German dictator, because they allowed class warfare to undermine their internal economy and morale.

We hear much about what should be done to insure the future of the United States. Its future will be determined, first, by the extent to which every class of its people considers the welfare of their country **alone,** and, second, put the welfare of their country above the supposed welfare of any and every class of its people. We never had an administration that did so much to exacerbate class feelings and antagonisms as the present one. In consequence, there never was so much class feeling as there is now. While we are thinking and talking so much about national defense, we could be doing nothing else so important as trying to reduce class feelings and antagonisms—because these growing class feelings and antagonisms among our own people are a much greater menace to their future happiness, prosperity and safety than all the dictators and armies of other countries.

Transportation Is Geared To National Defense

By Ralph Budd

President of the Burlington Lines and Member of the Advisory Commission to the Council on National Defense, Commissioner in Charge of the Transportation Division

Ralph Budd

OUR country is facing the greatest national defense program ever undertaken, a program which will place added duties and responsibilities of as yet unknown magnitude upon the transportation facilities of our country. I am confident that, with the full co-operation of all of the various agencies involved, and through proper organization and planning, all of the necessary steps will be taken to assure the prompt and rapid movement of goods, materials and men so essential in the present emergency. Furthermore, I anticipate that, in carrying on through this entire period, supplying the additional transportation needs of defense will in no way conflict with or result in curtailment of regular service to the civilian public.

Established primarily as an agency for bringing about co-operation and unification of effort, the Transportation division of the National Defense Advisory Commission has adopted a three-fold policy for attaining its objects, namely: (1) To anticipate all transportation needs as far in advance as possible. (This applies to industrial and agricultural needs as well as to the needs of our defense program.) (2) To arrange for the provision of all of the facilities necessary to meet the total requirements. (3) To insure that adequate service will be available by whatever agency the patrons may prefer to use.

20 Years of Progress

It is natural that when facing our present national emergency we should review in retrospect our national efforts of almost a quarter century ago. Together with the Great Lakes, the railways, comprising some 260,000 miles of lines and representing an investment of approximately $20,000,000,000, formed our national transportation agency of the era of the first world war. Prior to our entry into that conflict the railways were beset with a number of problems, including low rates, an acute labor shortage and no ready means of adjusting their rates to meet the ever-increasing costs of operation. At the same time, their operations were taxed nearly to capacity in handling the regular industrial and agricultural freight traffic of the country.

The progressive developments of the last 20 years have included the expenditure of $10,000,000,000 for the improvement of roadway facilities and the provision of better equipment so that the railway plant of today is more efficient and capable than ever before. Of significance is the fact that these expenditures were devoted to perfecting and enlarging the capacity of existing railway facilities and not for the building of new lines. Moreover, during the same period, an enormous additional sum totaling nearly $40,000,000,000 has been invested in other means of transportation, including highways, air lines and waterways.

Instead of the one chief agency of transportation of 1917, our country now possesses a huge transportation system comprising five distinct agencies. More than 1,000,000 miles of surfaced highways form a complete network extending to all parts of the country, on which more than 26,000,000 automobiles and 5,500,000 trucks and trailer units ordinarily handle about 90 per cent of our national passenger traffic and about 9 per cent of our freight traffic respectively.

More than 100,000 miles of pipe lines are in regular service carrying petroleum products and natural gas and account for the transportation of 14 per cent of our national freight traffic. Our inland waterways, especially the Great Lakes, have been developed to the point where about 14 per cent of our freight is carried on them. During the 1940 season more than 63,000,000 tons of

iron ore were carried on the Great Lakes. And while the airways are not essential to the transportation of freight, they are of inestimable value in the rapid delivery of important mail and express. Moreover, their service in passenger transport and their contribution to national defense mark an outstanding development in the present crisis, for of all transportation agencies the airways have the most to gain through technical development during the preparedness program which involves the manufacture of so many thousands of air craft of many different types.

The organization of today's national five-fold transportation system for national defense within this country is centered largely in the Transportation division of the Defense Commission. Individual representatives of each type of carrier, acting as consultants upon the staff of the commissioner in charge, as well as the Association of American Railroads and the Regional Shippers Advisory Boards, have rendered efficient and meritorious service. Indeed, without their assistance it would have been necessary to build up a much more extensive organization under the Defense Committee. The wholehearted cooperation of the Procurement and Production divisions of the Defense Council, as well as of the personnel of the Army and the Navy, also has played an important part in the progressive organization of all facilities to meet the additional transportation needs of our national defense program.

Rails Will Carry Two-Thirds of the Load

The foregoing summary of the functions of the five important branches of our national transportation system presents a marked contrast to the picture of 1917, and yet in our present emergency I believe that our railways will be relied upon to carry fully two-thirds of all the traffic of the country. Furthermore, if railroad facilities are taxed during the preparedness drive the burden will come from the stimulation of private enterprise to increase production for both civilian and military purposes, and not from spending for defense.

During the last few years slightly less than two-thirds of our traffic has been carried by the railways because of a depression period when the greater demand has been for consumer goods and not for as large a proportion of durable goods. In contrast to other carriers, except the Great Lakes, our railways handle a traffic consisting very largely of durable goods and their raw materials. The increase in total railway traffic will be in direct proportion to the extent to which the economic policies adopted by the government, by business and by labor will influence the increase in total production.

We have heard many expressions of apprehension about the possible recurrence of the congestion of cars and delays in railway shipments which were experienced during the first world war. Fear has been expressed that if our railways are again put to the test they cannot meet defense demands, and the reason assigned is the general deterioration of railway plants and equipment due to poor business and losses to competitors.

In considering some of these utterances, I have been impressed with what seems to be an incorrect analysis. A common approach to the question of the adequacy of the railways is by way of generalities based upon such data as the index of production issued by the Federal Reserve Bank and deductions made as to the car loadings which may be expected. Another criticism of the ability of the railways is based upon a comparison of today's total equipment with that owned in 1929, when car loadings were almost at their peak. Such criticism proceeds to point out the age of railway equipment and the financial difficulties which have overtaken many railways, and the conclusion is drawn that bankrupt railroads are handicapped by the deterioration of their physical plants.

Precluding the Possibility of Rail Congestion

It is true that during the first world war we experienced congestion and car shortages, but an impartial analysis of that situation reveals that the trouble was caused by failure to load and unload cars promptly, and not by failure of car movement. The wholesale issuance of priority orders, over which the railways had no control, resulted in the congestion of Eastern terminals, while the prolonged detention of cars for unloading not only prevented those cars from being used for transportation purposes, but also interfered with and retarded the movement of others so that additional congestion resulted.

Adequate control measures have been taken to prevent the recurrence of such a debacle. With the cooperation of shippers engaged in normal production, as well as those specializing in the production of materials for defense, of government agencies and the Army and the Navy, there is every reason to believe that this vital problem will be avoided.

Additional study of the criticisms leveled at the railways indicates that the Federal Reserve Bank Index has not in the past paralleled car loadings and, therefore, is not a reliable index of them; indeed it is not even an index of the country's total production. It is an index prepared by weighing certain factors which are reduced to a dollar basis. Records of the last several years show that, during periods of increasing business, the Federal Reserve Bank Index has always been appreciably greater than the carloading index. At such times, the graphs of these indices do not parallel, and there is good reason to believe that a still greater divergence will exist during the defense program period.

How Much Traffic—and Where?

Possibly the most perplexing question involved in the planning of national transportation is the effect of the preparedness program on production for commercial purposes other than defense. The defense load, in terms of car loadings, will be relatively small compared with commercial transportation, because the defense program must be paid for by the useful production activities of the country. The defense load may represent an increase of about 10 per cent, for experience indicates that an increase of even 10 billion dollars a year in expenditures for national defense could not possibly result in an increase of more than 15 per cent in the country's present freight traffic. In estimating the effect of expenditures for defense, one school of economists declares that for every carload of defense materials at least one or possibly two cars of materials will be produced for civil consumption. Others predict an adverse effect upon civil production and traffic, declaring that the defense load will not add to our total traffic movement.

A review of the 1940 carloading records contributes little to the analysis of the situation. The seasonal peak usually occurs in October; during 1939 the peak loadings amounted to 861,000 cars for the week ending October 19. In 1940 the peak occurred during the week ending October 26, when 837,651 cars were loaded. The peak load during 1940 was lower than in 1939, and yet 2,398,505 more cars had been loaded during the 50 weeks of 1940 ending December 14, than during the corresponding period of 1939, and the total loadings for the year will approximate 36,500,000 cars.

A summary of reports of individual railways furnished by the Association of American Railroads indicates that on December 1, 1940, there were 98,988 more serviceable

cars than on September 1, 1939. It is anticipated that, in the future, sufficient new cars will be added to maintain the present number and that the total will be increased as it is found necessary. I am confident that the railways are also taking advantage of the opportunity to secure locomotives, which are superior to those of a few years ago, and that the managements may be relied upon to continue this policy. Furthermore, by following a policy of individual railway purchase and repair programs, based upon information developed through cooperative action, as far in advance as possible, adequate equipment will be assured, and what is more important, it will be of the types best suited to the requirements of the individual railways concerned.

A study of data for the country as a whole does not in reality present an accurate basis for preparing plans for railway transportation incident to the defense program. Upon closer examination, it is evident that the present European war and its attendant results have produced two opposite effects on business and transportation in different parts of this country. Generally speaking, the highly industrialized eastern part of the United States has experienced an increase in business which has been reflected in a corresponding increase in traffic for its railways. During the same period, the agricultural Middle West has experienced an opposite and adverse effect. Export outlets for agricultural products from this section have been closed, with a consequent depression in the Middle West.

Information released by the National Industrial Conference board, a research organization sponsored largely by private industry, indicates that of the contracts awarded in connection with the procurement program for national defense up to December 1, 1940, 33.3 per cent of the value of all awards went to the Middle Atlantic states, comprising New York, New Jersey and Pennsylvania, while New England received 16 per cent, the South Atlantic states received 14.6 per cent and the Pacific states were awarded 16.8 per cent of the total.

Records for the country as a whole may show an increase of 9 per cent in car loadings, but it is significant that this average figure may represent increases up to 15 per cent for the Eastern section, as well as corresponding decreases in the West. Considering the various commodities, it will be found that while increases in carloadings ranged up to 45 per cent for iron ore, drastic reductions occurred in the movements of live stock and grain. Up to the present, the railways of the Middle West have relatively little defense traffic to offset their losses in other loadings. Hence, the transportation problem entails the consideration of not only the amount and type of traffic to be carried, but also the territory or region in which it will develop. So it is that we of the Transportation division, assisted by the Association of American Railroads, the 13 Shippers Advisory Boards and a staff of economists are engaged in determining, as accurately and as far in advance as possible, data on these two all-important points.

Better Equipment—Better Track—Better Supervision

A splendid illustration of the value of specific data, rather than generalities, in analyzing transportation problems is presented in the movement of iron ore from the mines to the docks of the Great Lakes by one of the railways of the Northwest. In 1929 the average time consumed in a round trip involving an average eastbound train of 13,353 tons was 12 hr. 4 min. In 1940 the average time over the same route was 10 hr. 16 min., a reduction in time of 15 per cent, while the average eastbound (or loaded) tonnage was 22½ per cent larger and amounted to 16,375 tons. The three fundamental reasons underlying this improved service are: (1) Better equipment, (2) better track, and (3) better supervision. Nor is this an isolated instance, for, to an extent not generally realized and understood, the same thing is true of all railways throughout the country. The whole tempo is much faster than it was 20 years ago, and dependability of service is almost perfect.

While the mileage of railway lines and the number of cars and locomotives throughout the country are not as large as they were 20 years ago, the 20,000 miles of railway lines which have been abandoned were branch lines which would have no bearing on the present situation. The cars and locomotives which were retired were generally of smaller capacity, the newer rolling stock is larger and the locomotives are more efficient and faster. The expenditure of 10 billion dollars since 1920 represents sound investment in better tracks, signals and equipment, making for greater capacity and higher speeds as well as for greater safety and dependability.

In many instances it has been inferred that railway mileage in receivership is naturally in poor physical condition. The fallacy of this observation is obvious, for today competition is so keen that railway property is not allowed to run down in the sense that it is physically unfit or unable to render good service. The process of reorganizing bankrupt railways usually involves the improvement of physical properties, studying the future prospects and the rearrangement of financial structures to assure stability.

Individual Responsibilities

Our government has, through its Chief Executive, outlined its desire that the national preparedness program shall be carried out with as little disturbance as possible to the normal life, trade and commerce of the country, as well as to that of each individual community. Under these circumstances, I believe that, through cooperative action, policies may be promulgated to each individual railway, sufficiently in advance to enable it to provide adequate transportation through every phase of our defense program.

There is no evidence of a desire on the part of responsible government officers to take over the railways. On the contrary there is the expressed hope that they will be able to function adequately under private ownership and private management. This expression of confidence carries a challenge and confers a responsibility which all of us should realize and fully discharge. This is, to fulfill our obligations in such manner that no reasons are ever allowed to arise for changing that attitude. The cooperative control machinery, which has been set up, provides that railway service, railway equipment and railway facilities can be geared to the defense load as rapidly as the defense requirements can be learned. The analysis of regional problems and requirements forms a means of determining and providing for our national needs in the order of their relative importance.

In spite of the huge expenditures for national defense which are now underway, there exists the keenest of competition among all classes of carriers. No trouble has been experienced in furnishing transportation in an orderly way. It would seem rash to assert an existing capacity which would handle any and all requirements, without knowing what those requirements will be, but it does seem reasonable to say that, by closely following the development of the defense program, the transportation facilities of the country can be so utilized that there will be no serious delays in fulfilling all of the transportation requirements of the national defense program, as well as those of our civilian population.

What Is the Outlook for 1941 Traffic and Earnings?

Rising national production seen increasing loadings by around 10 per cent—If basic costs are kept in check, net operating income might exceed 800 millions

By J. G. Lyne
Assistant to Editor

IN the following an examination is made into the possibilities of 1941 freight traffic volume, as measured in carloads, by an appraisal of two factors which largely determine the magnitude of traffic. The factors thus examined are (1) prospective increases in employment, particularly in the durable goods industries, and (2) the probable increase in the volume of industrial production. The bearing which these factors have heretofore shown on railroad traffic is observed, and the predictions of authorities on the movement of these factors in 1941 are taken as a guide to 1941 railroad traffic. Such estimates are checked (a) with A. A. R. President Pelley's estimate of 1941 traffic and (b) the effect on railroad traffic which munitions activity has already demonstrated in Canada.

These calculations are then synthesized and a prediction of possible 1941 traffic is derived from them. Once this figure is attained the probable profitability of the increased traffic is then sought (by an observation of past experience) to derive a figure of probable net railway operating income. The figure we get by this process is upwards of 800 million dollars—or more net railway operating income than the carriers have earned in any year since 1930. But this figure can only be used safely with important qualifications—and these qualifications can be fully understood only by a knowledge of the process by which the figure was reached. This process is the following:

How Will Rising Employment Affect Loadings?

The National Industrial Conference Board has estimated that, from October, 1940, to June, 1941, because of the national defense program, some 2.6 million additional workmen will find jobs. This estimate does not take into account the additional jobs which may be provided in industries outside the defense program in supplying the increased demands for goods of these defense employees. Some estimates by other persons for the prospective increase in "outside" jobs run as high as 2 or 3 million. If this supplemental increase be placed, conservatively, at 1 million—that will still mean that 3.6 million people will have jobs next June who did not have them in October, 1940, and possibly the total may go higher than that.

After June, 1941, however, on the basis of the *present* national defense program, defense employment will begin rapidly to decline so that, by December, 1941, the total employment in the defense program will be less than it was in November, 1940. This estimate, of course, is based on the assumption that no further defense appropriations are going to be made—an assumption which seems extremely doubtful. Unless the war in Europe ends favorably, from the American viewpoint, during the coming six months, it would seem that the latter half of 1941 ought to see the level of employment attained by June, at least maintained throughout the balance of the year.

Jobs Rise Mostly in Durable Goods

Economic prognostication—when political and military factors predominate—is pretty largely guess-work. On the other hand, assuming that these political factors may be depended upon, it looks as if total employment in the U.S.A. during 1941 might reach a peak of 4 million or more higher than the level of the late fall, 1940. If employment should reach such a peak, the average for the whole year (provided the defense effort does not slacken in the second half) might easily be 3,000,000 above that obtaining in the fall of 1940. The average employment in this country in 1934 exceeded that of 1933 by slightly less than 3,000,000—and that increase in jobs brought an increase of only 1,625,000 in annual carloadings (less than 6 per cent). However, from 1934 to 1936, there was an increase of 3,781,000 in employment—and that increase brought a rise in annual carloadings of 5,164,000 (almost 17 per cent). The difference in the effect of the increase in employment upon carloadings in the two periods lies in the fact, probably, that the 1933-34 rise saw an increase from only 50 to 57 in the index of durable goods production; whereas, from 1934 to 1936, that index rose from 57 to 99.

The nature of the rise in traffic which can be looked for under the defense program is more akin to that of 1934-36 than to that of 1933-34. Assuming that the 1941 increase in employment above the October, 1940, level will be somewhat less than the increase (3,781,000) from 1934 to 1936—still it does not seem extravagant to assume (on the basis of presumptive increases in employment, primarily in durable goods) that the annual carloadings in 1941 might be as high as 4,000,000 greater than the level at which they were running in October, 1940. Carloadings in October, 1940, were at the level of 75 per cent of the 1923-25 average—which would make them 37,395,000 for a whole year, which was about what loadings were in 1937. Four million added to that would be 41,395,000—which would be about 10 per cent less than in 1930 and 22 per cent less than in 1929; but it would be almost 14 per cent higher than 1940 loadings. This figure, quite likely, is too large, rather than too small, as a probable total for 1941 loadings. On the other hand, it is not so far beyond the realm of possibilities that it can be dismissed from calculations.

The Federal Reserve Board index of industrial production (on the new basis) averaged about 121 for the entire year 1940, as compared with 108 in 1939. This increase of 13 points in this index was accompanied by an increase in carloadings of better than 2,000,000 (1940 compared with 1939). By November, 1940, the F. R. B. index had mounted to 131. There are competent observers who believe that, in 1941, this index will reach a temporary "ceiling" at around 140—being held there for the time being because the capacity of certain basic industries will have been reached. If the F. R. B. index attains 140 as a "ceiling" in 1941, it probably will average several points short of that for the year as a whole (say, perhaps, 135)—even if the defense effort continues at a maximum level in the second half of 1941. An average of 135 for the year would represent an increase of 14 points over the 1940 average—or practically the same increase as that which occurred from 1939 to 1940.

Assuming that a further rise of 14 points in the F. R. B. index would produce a slightly greater rise in railroad traffic than the increase of 13 points produced in 1940 over 1939—then 1941 carloadings would be, possibly, only some 2½ million higher in the coming year than in the year just past—or, perhaps, not more than 39,000,000 for the year. Such a computation, quite likely, is unduly conservative. For one thing, the *primary* increase in the F. R. B. index, now going on, is coming from the durable goods industries—which are the principal source of volume traffic on the railroads. Also, the withdrawal of some shipping from coastwise and intercoastal service, existing or prospective, may give the railroads a larger proportion of industry's total tonnage to handle.

The Estimate by the A. A. R.

In a statement issued to the press on December 30, President Pelley of the A. A. R. estimated that 1941 traffic may "run from 7 to 10 per cent above 1940". Since the level of traffic at the end of 1940 was already running about 7 per cent above that of a year ago—and the volume of industrial production in connection with the defense effort has a considerable distance to go before it reaches its peak—Mr. Pelley's estimate fully supports that in the preceding paragraphs. If 1941 loadings are only 7 per cent above those of 1940, they will fall just short of 39,000,000. If, on the other hand, they prove to be 10 per cent above 1940, then the total loadings for the year will be just short of 40,000,000.

What Canada's Experience Suggests

The experience of Canada may afford some criterion as to what may be expected in this country. Reports from the Dominion now indicate that the industrial labor force there is just about fully employed—and basic industries, which serve the munitions program, are working approximately to existing capacity (although, of course, capacity is being greatly increased). Omitting grain and livestock (since shipment of these commodities is not primarily determined by demand factors), Canadian carloadings for the first 48 weeks of 1940 were approximately 13 per cent higher than for the same period in 1939. In the United States, comparing the same periods, the carloadings increase (omitting grain and livestock) was only 8 per cent.

The United States is, probably, from 6 to 9 months behind Canada in the intensification of its munitions effort. That is to say, Canada was approaching maximum utilization of its then-existing plant capacity by September or October, 1940, whereas the height of the U. S. Program is not expected to be reached until next June. As has been seen, Canada's carloadings rose 13 per cent from the first eleven months of 1939 to the same period of 1940. It would not be a strict parallel to relate the United States in 1940-41 to Canada in 1939-40—because there was very little munitions tonnage in Canada's 1939 loadings for the first 11 months, whereas there was a considerable volume of such tonnage in U. S. 1940 loadings. So, based on Canada's experience, possibly an increase of 13 per cent in U. S. 1941 loadings over those of 1940 (as Canada's 1940 loadings exceeded those of 1939) would be too much to expect. Something around a 10 per cent increase for the U. S. would appear to be more reasonable. Admittedly, this comparison, by itself, would have little significance, because it rests for its validity on the unproved assumption that the ratio of unused industrial capacity to total in Canada was the same at the beginning of its war effort as that of the U. S. Some importance may be attached to the figure, however, from the fact that it is within the range of other estimates of probable 1941 traffic, made by different methods.

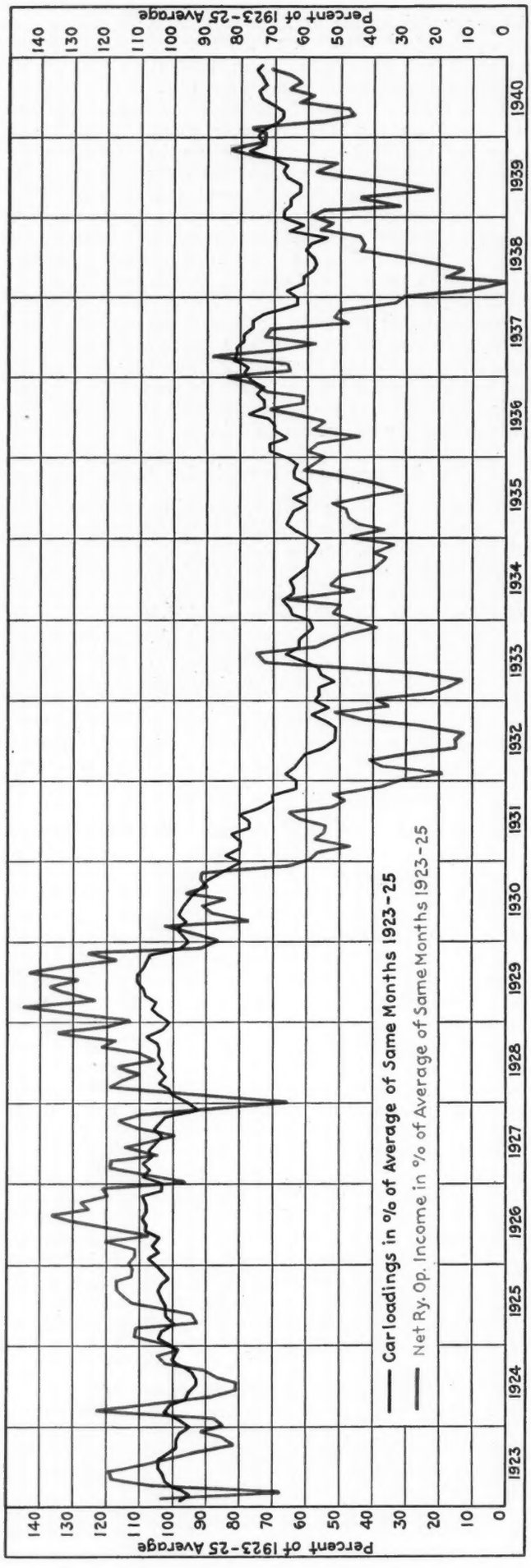
A Forecast of Possible Loadings

Taking a synthesis of the foregoing calculations, it would appear to be reasonable (granting a continuance of the defense effort) to predict that railroad freight traffic in 1941 ought not to be less than 39,000,000 carloads—and possibly that loadings may go as high as 41,000,000. It is well to bear in mind, though, that even the lower estimate might prove too high, if there should be a sudden cessation of hostilities—and a consequent diminution in the defense effort in the second half of the year. The higher figure—41,000,000 or slightly better—hinges on a rapid increase in reemployment up until June and the maintenance of the high level then attained throughout the remainder of the year. There is a large element of chance in such a conjecture—yet it is a possibility.

While the forecasting of probable traffic under present conditions involves unusual hazards, the estimation of possible net operating revenues carries with it even more elements of uncertainty. In the long run, each increment of traffic might be expected to contribute a growing ratio of net operating income. In the short run, however, a sudden increase in traffic, such as that which occurred in 1939, is likely to prove very profitable, as far as the record goes—because maintenance expenditures cannot be increased as rapidly as they need to be to enable the property to withstand the added load. As the higher traffic volume continues, maintenance expenditures are increased—not only to care for current needs but to make up for back maintenance accumulated during the initial spurt of traffic. So a second increment in traffic will not show as much profit on the books as the first increment did. For example, from 1938 to 1939, carloadings increased by 3,600,000 and net railway operating income increased $216,000,000—while, from 1939 to 1940, loadings went up 2,250,000 and net railway operating income increased by only $61,000,000. Each additional carload from 1938 to 1939 brought a $60 increase to net railway operating income—while each additional carload from 1939 to 1940 added only $27 to net railway operating income.

How Profitable Will New Traffic Be?

If it be assumed that carloadings in 1941 will be, say, 10 per cent greater than 1940's total of 36,350,000—that increase would add $208,000,000 to net railway operating income, if the added traffic were as profitable per car (i.e., $60) as the increase in traffic which the railroads secured in 1939. If the additional traffic were no more profitable than the additional 1940 traffic has been



How Net Operating Income Is Related to Carloadings

Chart Shows Carloadings and Net Railway Operating Income as Percentages of Average Loadings and Earnings of Same Months 1923-25

(i.e., $27 per car) then 3,635,000 additional carloads would add only $98,000,000 to net railway operating income. As a matter of fact, though, since maintenance expenditures have so largely increased in 1940, the profitability of the increased traffic might be expected to be nearer the 1939 figure than that of 1940. If this supposition be sound, then net railway operating income approaching $850,000,000 would seem to be well within the range of possibility.

Also, bearing upon the probable profitability of increased traffic in 1941, is the fact that defense traffic does not suffer seasonal variations. It is a noteworthy fact that the railroads in 1940 handled 2¼ million more carloads than they did in 1939, while the peak loadings of 1940 were almost 20,000 less than the 1939 peak. This is to say that the traffic arising from the defense effort is not subject to the usual economic forces which create seasonal fluctuations—hence it can be handled by the railroads with a minimum of stand-by plant, a fact which should have a bearing on the net railway operating income which it will produce.

These Shadows May Grow More Menacing

But, unfortunately, there are quite as many shadows as there are bright spots in the picture of the probable profitability of railroad operations in 1941. Some rises in prices of materials are certain; and what demands the labor organizations may make, and succeed in establishing, remain to be seen. It is impossible to gage the effect of such unknown factors—beyond recognizing their existence, and concluding that their effect on net railway operating income will be great or little depending upon whether the factors themselves develop great momentum or not.

However—*if* the defense effort is continued throughout the second half of the year at the maximum expected to be reached in June, and *if* the increases in labor and material costs are only nominal, and *if* there is no change in the method of calculating the carriers' liability for taxes—then the chances appear to be pretty good that 1941 traffic approaching 40,000,000 carloads may be expected and that it will yield the railways not far from 850 million dollars in net railway operating income.

JESSE JONES ON 1941 PROSPECTS.—"Business moves into 1941 operating at record levels," said Commerce Secretary Jesse Jones in a statement on December 29. "It can look back on the year just past as one of vigorous expansion which in total produced the best results in a decade. It can look forward to 1941 as a year that will bring further progress, and the advance of our per capita output to a new record. The business outlook for the coming year is unusually bright. Many firms have record backlogs of unfilled orders; the volume of new orders continues to be extraordinarily high; and expenditures by the Army and Navy are being made at an accelerated pace. We face many problems of adjustment during the coming year—it must be a period of hard work and cooperative endeavors geared to meet the imperative requirements of the world today. We must increase production and to do this we must recognize the urgency of and meet the capacity problem. We can not afford to repeat the mistakes of other democracies which permitted irreplaceable time to slip by without pushing production to the full potential of labor and raw material resources."

The Steel Mills Are Aglow with Activity

Railway Supply Industry Is Ready

Extensive facilities can handle defense orders without interference with railroad needs

By Raymond A. Doster

Associate Editor

FOR the second time in the history of the United States, the railroad supply industry has sprung to the aid of the government to play a major role in armament. To date, it has contracted to make more than $1,000,000,000 of army and navy supplies or nearly one-tenth of the total orders so far placed by the government under its present defense program, and, because of its extensive facilities, a survey by the *Railway Age* discloses, is able to take on this gigantic task without interrupting the flow of materials and supplies required by the railroads.

Planning More Orderly Than in '17

Although the task undertaken by the railroad supply industry is of considerable magnitude, it is somewhat dwarfed by the program which these companies executed successfully during the World War. Too, the job this time is less difficult because the plans of the government are more thoroughly prepared and are unfolding in a more orderly manner. During the World War, the railroad supply industry was called upon to manufacture almost all kinds of war materials, including guns and projectiles, while at the same time the industry continued to produce products for the railways. The manner in which the industry met the demands placed upon it by the railways is reflected in the fact that railway purchases increased along with government buying. Thus, the railways spent $821,687,786 in 1918 for materials, supplies and miscellaneous items, as compared with $550,913,977 in 1916 and $611,575,889 in 1917. In these same war years the supply industry was called upon to furnish a yearly average of 5,332 new locomotives, 125,702 freight cars and 1,776 passenger cars constructed for domestic and foreign use, as compared with 2,035 locomotives, 70,142 freight cars and 1,866 passenger cars built in 1915.

Up to the present time, Congress has appropriated about $15,000,000,000 that will be spent by the army and navy during the next two years and, of this amount, $10,500,000,000 was let in contracts between June 13 and December 10. Of the total appropriation, the larg-

est portion will be spent for airplanes and ships although the expenditures for tanks, trucks and munitions will be very large.

The railroad equipment companies are being called upon to produce heavy artillery and large calibre ammunition just as they were during the World War, while in addition, several companies are also participating in the tank program and some are supplying such items as Diesel-electric engines, machinery, castings, gears, tools, air compressors, fencing, grinders, lumber, bedsteads, electric motors, ammunition components, chemicals, radio equipment, steel forgings, air-hose couplings, welding sets, rivets, glass, paint, fire control equipment, pneumatic saws, springs, tractors, nails, pipe, valves, indicators and cranes.

The major portion of the orders given to supply companies thus far has gone to the larger concerns. Heading the list are the steel, locomotive and car companies. Among these, the Baldwin Locomotive Works has orders for $100,000,000 of materials and the American Car & Foundry Company is doing $93,000,000 of war work for the United States and Great Britain. Other large companies which have received substantial orders include the American Locomotive Company, more than $38,000,000; the General Electric Company, more than $33,000,000; Fairbanks, Morse & Company, more than $20,000,000; Edward G. Budd Manufacturing Company, $19,683,000; the Westinghouse Electric & Manufacturing Company, more than $12,000,000; the Pullman-Standard Car Manufacturing Company, $11,000,000; the Buda Company, $8,000,000; the New York Air Brake Company, $5,000,000; the General Railway Signal Company, more than $5,000,000; the Pettibone, Mulliken Corporation, $3,800,000; the Pressed Steel Car Company, more than $3,500,000; the Symington-Gould Corporation, $1,800,000; the American Brake Shoe & Foundry Company, more than $1,000,000; and the Franklin Railway Supply Company, Inc., $1,000,000. In addition to the orders from the United States, several railway supply companies have accepted orders from Great Britain, but this business is as yet small in comparison since actual exports of arms, ammunitions and implements of war from the United States to the entire British empire during the first 10 months of 1940 amounted to only $165,580,960.

Industry Can Handle All Business

The survey made by the *Railway Age* shows that the larger companies of the country are meeting the requirements of the United States and Great Britain and will continue to be able to do so unless present programs are materially enlarged. As a result, orders for materials for armaments have not yet filtered down to the smaller railroad supply company plants and railroad accessory manufacturers as they did during the World War.

The survey also discloses the fact that the defense work now being done by the railroad supply companies is being done largely in facilities that have been idle and that it has not been necessary to use properties that have been engaged in the manufacture of railway products. Replies from companies questioned in the survey show that only a small portion of their plant capacity is being used for armament materials. The highest defense utilization reported was 35 per cent of total capacity.

One of the major concerns in the armament program has been the ability of the steel companies to fill their armament orders and supply other companies with needed iron and steel. The idea that the country is facing a steel shortage and that the defense program may presently be affected by a "bottleneck" in steel production has been refuted by the Iron and Steel Institute. This institute reports that the steel industry today has an annual rated producing capacity of approximately 83,000,000 net tons of ingots, including capacity of new furnaces installed since the first of this year. Steel requirements of the defense program are not expected to exceed an annual maximum of 7,000,000 to 8,000,000 net tons of ingots. Accordingly there appears to be no possibility of a shortage of steel for the armament program in any of its ramifications.

"Furthermore the industry's rated capacity for producing ingots actually is at least 10 to 12½ per cent below its real capacity, that margin being only the allowance for breakdowns and repairs of furnaces. With such a margin available, the industry in an emergency could push operations to an average of 5 per cent above rated capacity, thus adding some 4,000,000 tons of ingots to yearly output. That would give the industry a total potential capacity close to 87,000,000 tons in any one year.

Steel Industry Thoroughly Modern

"Large sums have been spent by the industry during the last ten years for plant and equipment. It is in splendid physical shape. There is every reason to expect that the industry would be able to operate close to rated capacity for sustained periods, and to go beyond it for occasional periods. In 1917, for example, operations were maintained at capacity for seven consecutive months.

"Predictions of a coming shortage of steel apparently are based entirely on the assumption that defense activities will lift the public's demand for steel products to levels at least equal to the hitherto unprecedented peak of 1929. Even if it were true that the 1929 peak of per capita use of steel for non-military purposes is to be reached, present steel capacity still would be equal to the demand. In that year the per capita domestic consumption of steel in the United States was less than 950 lb. of ingots. Applying that per capita figure to the country's present population gives a total of 62,000,000 net tons of ingots or 25,000,000 net tons more than the annual average of domestic consumption over the last 10 years.

"Should the domestic use of steel rise to that unheard-of figure, with exports continuing at the current record rate of 12,000,000 net tons and maximum defense needs reaching 8,000,000 net tons, all at the same time, the grand total of all requirements, figured in terms of ingots, would be 82,000,000 net tons. That compares with a rated capacity of nearly 83,000,000 tons and potential emergency capacity of about 87,000,000 tons.

"What is true of steel ingots is true also of finished products. The country's rolling mill capacity, in the large, is ample for all possible requirements. For a few special products, some additions to facilities are already being made by various companies, but the need for extensive additions to finishing capacity is not present."

Machine Tool Industry Booked to Capacity

The machine tool industry presents a problem that might affect other industries in that 80 per cent of its capacity is now being used in connection with the defense program. Yet here, increased output, according to the National Machine Tool Builders Association, has been accomplished by plant expansion, by the installation of new equipment, by sub-contracting work to outside companies and by training large numbers of new men and thereby operating equipment as continuously as possible.

The extent to which the industry had geared up for a new high volume long before the threat of war was generally recognized in the United States, is reflected in the fact that output increased from $22,000,000 in 1932 to $200,000,000 in 1939, or $15,000,000 more than in the peak year of 1929.

Of 115 companies reporting to the association, 65 recorded additions to plants between August, 1939, and September, 1940. In most cases such additions represent increases of about 30 per cent to existing manufacturing area. Others reported that they are using idle facilities. A total of 106 companies installed $20,000,000 of new equipment in this period.

On the basis of what the industry has accomplished in 1940 and in the light of the steady increase in production and the further expansion planned or contemplated, the association anticipates that machine tool production for 1940 will be $400,000,000 and for 1941 $600,000,000. Action to speed up machine tool production was taken by the government in December when immediate expansion of the production facilities of three large machine tool companies was authorized by the war department. Under the government's plan, these companies and others to follow, will finance expansions themselves and will be repaid by the government over a five-year period. In the interim they will rent these added facilities from the government for the manufacture of machine tools required by all phases of the armament program.

Car Builders Have Adequate Capacity

The ability of the car builders to construct railway cars and a large number of military tanks, shell forgings, fuses, bridge pontoons, demolition bombs and miscellaneous articles is best reflected in a letter from Charles J. Hardy, president of the American Car and Foundry Company, to stockholders, in which he said: "A contract for military tanks was awarded the American Car and Foundry Company in the latter part of October, 1939, and the work preparatory to its execution was at once, and most vigorously, undertaken. This necessitated the adaptation of a considerable portion of one of our principal plants for the work which was entirely different from our ordinary business of building railroad equipment and involved new building construction, the procuring and installing of the required facilities and the training of personnel for its handling. All this work proceeded so quickly and effectively that in March, only five months after the award, we were actually in production under this contract, and in May, two months later, the first completed tank was delivered to the government. This, your management believes, is a record practically without parallel and one of which your company has every reason to be proud since it is a demonstration of the efficiency of our organization, and, above all else, its willingness and ability to play its part in the program of preparedness for our national defense.

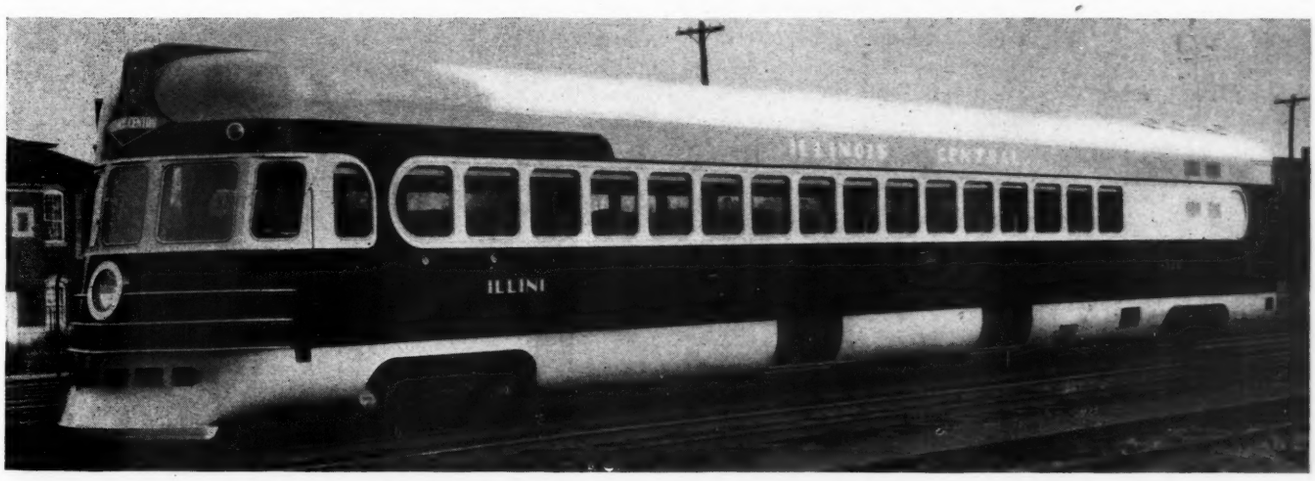
"In addition to a contract for shells for Great Britain, your company has been given a contract by our own government for forging 800,000 155 mm. shells. The work under both these contracts will be done at one of the company's plants that has been out of commission for a number of years, but which has been rehabilitated and equipped for the execution of these particular contracts and such others of a similar, or other, kind as may be undertaken."

The Pullman-Standard Car Manufacturing Company, which also has large contracts with the United States and Great Britain, is likewise using facilities that have been idle. Its plant at Hammond, Ind., is handling ordinance in that section while its Butler plant is engaged in the manufacture of shells.

During recent years the plants of the car builders have been so adjusted as to produce only the small number of cars ordered by the railways, and as a result, it is difficult to determine what their maximum capacity would be under an emergency. It is estimated that under favorable conditions, the facilities that will be available for car construction can turn out 150,000 cars a year. This estimate is based upon the assumption that time will permit the retooling of shops and the training of more men and that the railways will order such quantities and types as will enable the builders to work on a production schedule. In 1940 the car companies built about 45,000 freight and about 200 passenger train cars and it is estimated that they could have built 90,000 freight cars without difficulty.

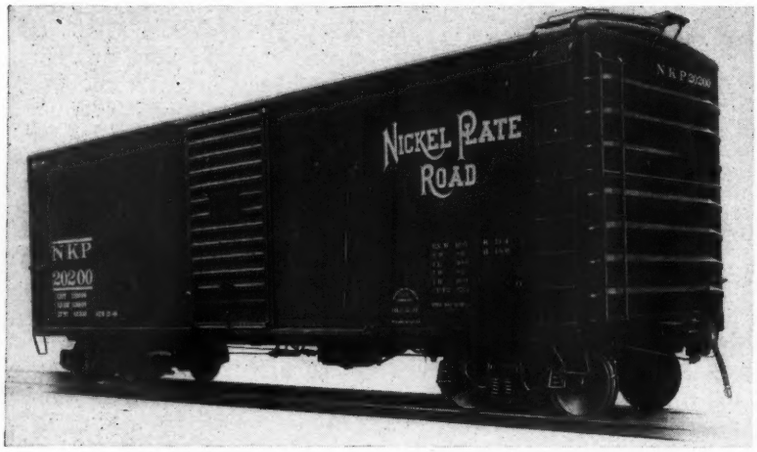
The above analysis of the ability of the railway supply industry to handle railroad and government orders in 1941 and 1942, is based upon the requirements of the present defense program of the United States and the limited orders so far placed in this country by Great Britain and does not attempt to take into consideration conditions that might arise should the United States become a combatant or should the government force industry to utilize a large portion of its capacity for the construction of armaments for Great Britain. Should present plans be enlarged, the railway supply industry could devote a considerably larger portion of its facilities to the manufacture of war materials.

* * * *



One of Two Streamline Rail Cars Built for the Illinois Central by the American Car & Foundry Company

Decline in Freight-Car Supply Checked in 1940



A Welded and Riveted Car Built by American Car & Foundry Company

Maximum demand eased by a relatively low fall peak—60,000 to 100,000 new cars needed in 1941

By C. B. Peck
Mechanical Department Editor

LAST year produced the largest volume of freight traffic of any year since 1937. Total net ton-miles aggregated something over 400 billion as compared with 396 billion in 1937. Neither the total carloadings nor the carloadings during the highest consecutive four weeks of the fall peak, however, reached the values attained in 1937. In that year total carloadings amounted to 37,670,000 and the average weekly loadings during the four highest consecutive weeks in the fall was 829,000. In 1939 total loadings amounted to 34,100,000, and the peak averaged 839,000 per week. Last year total loadings amounted to 36,350,000 and the peak averaged 817,000 per week.

The total cars on line on October 1, as reported by the Car Service Division, showed a decline for the year, thus continuing the trend which has been unbroken since 1930. The decline was small, however, and indicates a decided check in the downward tendency of the past ten years. Furthermore, the number of cars awaiting repairs on October 1 was the smallest of any year recorded in the table, although the percentage was not as low as that attained during 1928 and 1929. The reduction in the number of bad-order cars was 64,000 compared with October, 1939.

From an inspection of the table it becomes evident that there was a considerable margin of freight-car capacity available during the fall peak of 1940. Reducing the number of cars awaiting repairs to about 6 per cent of the number on line, an additional 36,000 cars could have been made suitable for service. Repeating the best performance for the utilization of active cars previously attained, this would have made possible a probable maximum utilization up to an average of 890,000 carloads per week during the four highest consecutive weeks of the fall peak.

There may be some question on two points involved in this estimate. First, what is the minimum practicable net surplus below which serious shortages may develop? The 1940 minimum surplus of 75,000 cars is the lowest in the table for which there is no record of accompanying

Trends in Freight-Car Supply and Freight-Car Utilization

	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	Probable maximum utilization with October, 1940, car supply
(1) Peak loading (000)*	1,184	1,186	960	768	635	658	641	721	820	829	711	839	817	890
(2) Total carloads for the year (000)	51,590	52,828	45,887	37,151	28,180	29,220	30,846	31,518	36,109	37,670	30,457	34,103	36,350	....
(3) Cars on line (Oct. 1) (000)	2,238	2,223	2,226	2,178	2,118	2,019	1,908	1,834	1,743	1,705	1,673	1,616	1,610	1,610
(4) Surpluses, minimum (000)	86	107	389	532	545	377	318	208	112	102	139	64	75	75
(5) Awaiting repairs (Oct. 1) (000)	148	133	157	194	262	295	296	284	242	188	231	195	131	95
(6) Active cars (000)	2,004	1,983	1,680	1,452	1,311	1,347	1,294	1,342	1,389	1,415	1,303	1,357	1,404	1,440
(7) Cars on line per weekly carload	1.89	1.88	2.32	2.84	3.34	3.07	2.98	2.55	2.13	2.06	2.35	1.93	1.97	1.81
(8) Active cars per weekly carload	1.69	1.67	1.75	1.89	2.06	2.05	2.02	1.86	1.70	1.70	1.83	1.62	1.72	1.62
(9) Active cars per cent of cars on line	89.5	89.5	75.5	66.7	62.0	66.8	68.0	73.4	80.0	83.0	78.0	83.9	87.4	89.5
(10) Period of car shortages	9/23-10/22	9/23-10/31†	None	None	None	None	None	None	9/30-12/30	1/1-7/31	None	9/15-10/31	None	....
(11) Maximum shortages reported	454	....	....	....	....	....	....	....	836	3,035	....	721	....	....

* Average of four highest consecutive weeks.
† Small shortages, each aggregating fewer than 100 cars, were reported during a number of weeks earlier in the year.
All of the data in this table are taken from A.A.R. Car Service Division Reports. Items 1 and 2 are from Form CS-54A. Items 3, 5 and 6 are from Form CS-60A. Items 4, 10 and 11 are from Form CS-44A. Items 7, 8 and 9 are calculated.

shortages. For the purpose of this estimate, therefore, a minimum surplus of 75,000 cars is assumed to be as low as can practicably be attained. Second, to what minimum can the number of cars awaiting repairs be reduced? As a percentage of cars on line the best records within the period covered by the table were attained in 1929 and were just under six. The 131,000 bad-order cars on October 1 of last year were 8.1 per cent of the cars on line. The probability that the number of bad-order cars can be reduced much below 6 per cent is not large and a minimum of 95,000 such cars is believed to be, if anything, a little too low for conservatism.

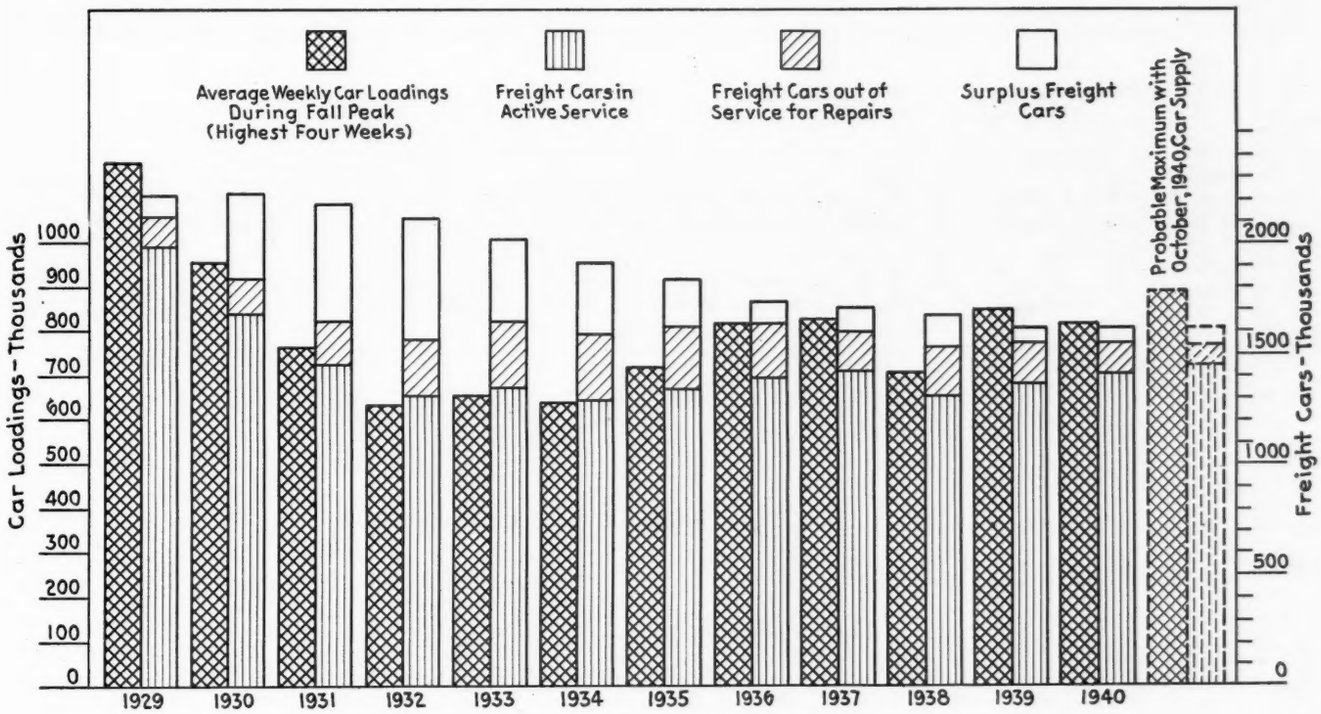
All signs point to considerably more freight traffic in 1941 than was handled last year. The emergency program for national defense, which undoubtedly was a factor in the increase in industrial production and traffic during the second half of 1940, has not yet reached its full stride. Indeed, full-scale production will probably not be reached until 1942.

It is, of course, impossible to predict with certainty just what will be the increase in the total volume of traffic to be handled in 1941. That it will lie somewhere between 10 and 15 per cent, however, seems likely, and a total carloading for the year of 41 million is well within the range of probabilities.

But to determine the probable demand on equipment capacity it is necessary to know something of the magnitude of the fall peak as well as the total volume of business for the year as a whole. The relation of the fall peak carloadings to the total carloadings for the year depends upon at least two factors. The first and more important is the trend of traffic development during the year, particularly during the last half of the year. When the trend is sharply downward during the second half of the year, the percentage of the year's carloadings produced during the four fall peak weeks is low. When the trend of traffic is sharply upward during the last half of the year, the percentage is high. The range is from slightly less than 9 per cent to slightly less than 10 per cent.

The other factor which may have influenced the results in 1940 and may continue to influence those in 1941 is the effort on the part of government procurement agencies to fix delivery dates as far as practicable with a view to causing minimum market disturbances; i. e., to fill in the valleys of production and thus utilize the full capacity of our industrial establishment with as little increase in peak demand as practicable.

Whether this factor influenced the results during 1940 or not, a peak of nine per cent of the year's carloadings during the four highest weeks was only slightly above the minimum which would normally accompany a sharply declining traffic volume during the second half of the year.



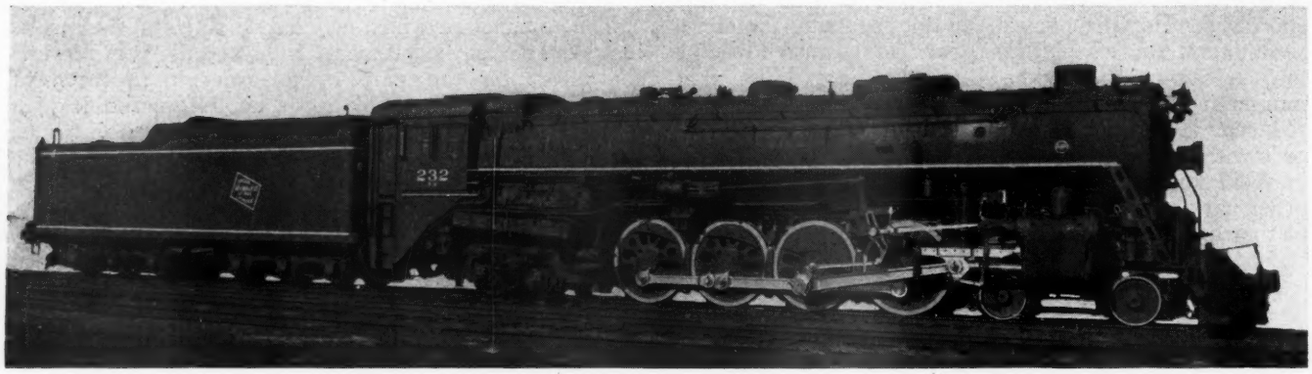
Trends in Freight-Car Demand and Freight-Car Supply During Fall Traffic Peaks

Assuming a continuance of the influences which resulted in a relatively low peak during 1940, a peak averaging about 925,000 cars per week may be anticipated next fall. Using maximum intensities of utilization as set forth in the table to meet such a demand would require about 95,000 more active cars than were used during last fall's peak. Allowing for the greater intensity of utilization which could probably be made of the total cars on line at that time, the need for a net increase in that number of approximately 60,000 cars would seem to be conservative.

During 1940 over 50,000 new cars were turned out by the builders and from railway company shops, of which probably between 80 and 90 per cent have gone into service on Class I railroads. The overall change in the ownership between the beginning and end of the year, however, was small, indicating a continuation of retirements during the past year at a substantial rate. With the same retirements next year the procurement of at least 100,000 cars would seem to be necessary during 1941.

The estimates in this article are based on the assumption that our national economy will continue to be built around the present national defense program, with

(*Continued on page 20*)



Built by Baldwin in 1940

Reduced Locomotive Inventory Is Affecting Capacity

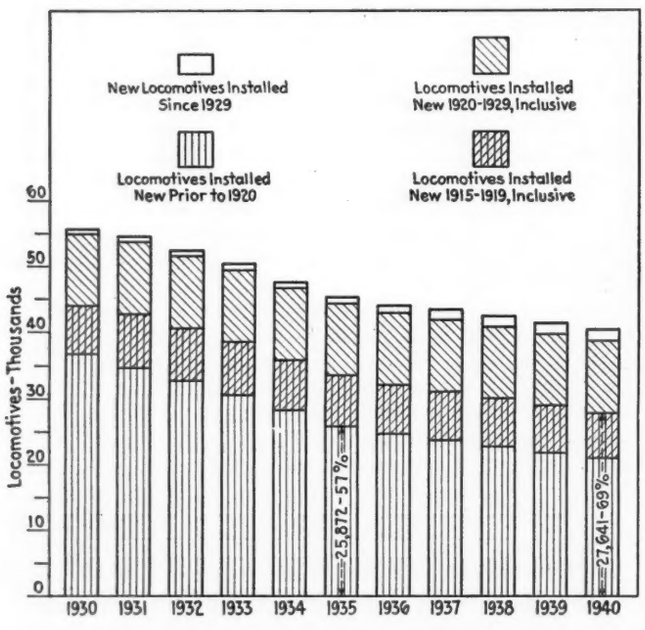
The motive power reserve, during October peak, is now less than 10 per cent—69 per cent of steam locomotives now 21 or more years old

By H. C. Wilcox
Associate Editor

TEN years ago the railways of this country were facing two conditions—a major depression and the rising tide of competition—the gravity of neither of which was realized at that time. As the depression progressed toward the low points of 1933-34 the influence of this combination of circumstances with respect to motive power took the form of an almost complete cessation of buying and the apparent decision that the constant falling off in rail traffic warranted the retirement of a substantial portion of the locomotive inventory with the result that there are about 15,000 fewer locomotives now than there were 10 years ago.

While this was going on the encroachment of obsolescence, if not largely ignored, was not given the consideration that its importance justified, for in this period installations of new power fell to such small proportions that less than 2,600 locomotives now in service were built since 1929—only 1,800 of which are steam.

In the January 6, 1940, issue of *Railway Age,* page 14, appeared a table showing the age distribution of all locomotives. A table, similar in purpose, appears in this article. It includes only steam locomotives, which represent more than 96 per cent of the motive power inventory of the Class I railways. This table, and an accompanying chart show that 27,641, or 68.5 per cent, of the 40,355 steam locomotives in service in 1940 were 21 or more years old and that five years ago only 57 per



Recent Trends in Steam Locomotive Age

Age Distribution of Steam Locomotives—Class I Railways 1930-1940, Inclusive

	Locos. installed new since 1929 remaining in service*	Locos. installed new 1920-1929 inclusive†	Locos. installed new prior to 1920†	New locos. installed 1915-1919, inclusive†	Total locos. in service†
1930	735	10,957	44,183	8,150	55,875
1931	869	10,957	42,559	8,100	54,385
1932	905	10,957	40,630	8,054	52,492
1933	899	10,948	38,217	8,008	50,064
1934	958	10,933	35,545	7,882	47,436
1935	994	10,951	33,669	7,797	45,614
1936	1,062	10,938	32,162	7,769	44,162
1937	1,422	10,947	31,255	7,713	43,624
1938	1,566	10,924	30,147	7,635	42,637
1939	1,635	10,924	28,558	7,479	41,117
1940	1,790	10,924	27,641	7,449	40,355‡

* From I. C. C. Statistics of Railways of the United States, except 1940, which is estimated.
† Based on I. C. C. Statistics, except 1940, which is estimated.
‡ As of June 30, 1940, A. A. R. Car Service Division Report, CS-56A-1.

cent of the steam locomotives were 21 years old or older.

What is the effect of such a condition on present-day railway operation? Does it not mean that the demand for motive power to meet expanding traffic requirements necessitates the use of a greater number of aging locomotives with the result that not only the cost of operation but the efficiency of operation must eventually be adversely affected? And, still more important, what about reserve capacity? In 1939 the reserve motive power capacity in freight service during the October traffic peak, measured in number of locomotive units, was estimated to be about 10 per cent. During the 1940 October peak this reserve was 9.7 per cent with freight operations totaling 92,946,000,000 gross ton-miles as compared with 93,209,000,000 during the 1939 peak.

tives would be reduced to 4,530. Only once in the 18-year period covered by the table has the *unserviceable* power alone reached such a low point; that was in 1929, and then there were 2,680 locomotives stored serviceable. Now, in order to have 75 per cent of the freight power available to handle peak traffic it would be necessary not only to have the in-or-awaiting-shop group at a record low but every one of the stored serviceable locomotives would have to be put into service. It does not take much imagination to realize what that would mean—most any train despatcher could deliver an eloquent discourse concerning the results out on the road.

A Study of Freight Locomotive Utilization During the October Traffic Peaks

	Total freight locos.	Unserviceable	Stored serviceable	Active	Active locos., per cent total locos.	Aggregate tractive force, end of year (000)	Loco. miles (000)	G.t.m., (excl. loco. and tender) (000,000)	Freight-train miles (000)	Loco. miles per active loco.	Loco. miles per total locos.	Loco. miles per freight-train mile	G.t.m. per 1,000 lb. tractive force (000)	G.t.m. per train mile
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1923	33,203	5,947	1,865	25,391	76.5	1,793,785	65,973	92,640	58,492	2,600	1,990	1.13	51.6	1,584
1924	33,359	6,079	3,219	24,061	72.5	1,832,216	62,910	94,730	55,952	2,610	1,880	1.12	51.6	1,693
1925	32,390	5,423	3,055	23,812	73.5	1,827,207	65,568	100,026	58,512	2,760	2,020	1.12	54.7	1,709
1926	31,543	4,782	2,699	24,062	76.5	1,842,369	66,031	107,238	58,798	2,740	2,100	1.12	58.3	1,824
1927	30,960	4,626	3,418	22,916	74.0	1,815,903	64,231	105,797	56,582	2,800	2,070	1.13	58.5	1,870
1928	30,062	4,764	2,971	22,327	74.2	1,796,379	65,165	110,276	57,211	2,920	2,160	1.14	61.2	1,928
1929	28,912	4,477	2,680	21,755	75.5	1,768,968	64,756	110,444	56,748	2,970	2,240	1.14	62.2	1,946
1930	28,738	5,123	4,940	18,675	65.3	1,775,435	54,665	94,931	46,313	2,920	1,910	1.18	53.3	1,965
1931	28,667	6,071	6,225	16,371	57.3	1,755,779	44,903	75,403	40,250	2,740	1,560	1.11	42.8	1,873
1932	27,310	7,891	5,801	13,618	50.0	1,719,166	40,372	66,143	36,344	2,970	1,480	1.11	38.4	1,820
1933	26,925	8,985	3,787	14,153	52.8	1,672,763	40,589	65,812	36,476	2,860	1,510	1.11	39.4	1,804
1934	25,964	8,707	3,402	13,855	53.7	1,597,000	41,205	66,311	37,159	2,960	1,585	1.11	41.3	1,785
1935	25,144	8,414	2,213	14,517	57.9	1,567,482	45,151	75,671	36,858	3,120	1,800	1.22	48.2	1,895
1936	24,498	6,813	1,642	16,043	62.9	1,563,874	50,742	86,987	44,333	3,170	2,070	1.14	55.8	1,948
1937*	23,889	5,914	1,673	16,302	68.4	1,556,345	50,117	88,245	44,572	3,070	2,100	1.12	56.5	1,998
1938*	23,729	7,300	1,785	14,665	61.9	1,522,530	44,622	79,951	39,615	3,040	1,880	1.12	52.5	2,036
1939*	22,909	6,425	832	15,652	68.4	1,487,240	49,945	93,209	44,034	3,190	2,180	1.13	62.7	2,137
1940*	22,118	5,435	1,493	15,190	68.7	1,476,127	49,983	92,946	44,272	3,224	2,259	1.10	63.0	2,120

*Data from I.C.C. Bureau of Statistics, Freight Service Operating Statistics of Class I Steam Railways in the United States (Statement No. M-210); Freight-Train Performance of Class I Steam Railways in the United States (Statement No. M-211 OS-A), and Motive Power and Car Equipment of Class I Steam Railways in the United States, (Statement No. M-240 OS-F). Aggregate tractive force based on A.A.R. Car Service Division Form CS-56A-1 for the end of the year, except 1940, which is as of June 30.

A study of freight-locomotive utilization during the October traffic peaks over a period of 18 years appears in an accompanying table. The freight motive power inventory throws some light on the question of reserve capacity. The total number of freight locomotives has reached an all-time low—22,118—and, with the exception of the prosperous years of 1925-1930, when there were from 6,000 to 10,000 more freight locomotives than there are now, the number of unserviceable units is at a minimum. With the exception of 1939, when there were almost 800 more locomotives in service, October, 1940, showed the lowest number of units stored serviceable. In the statistics of operation the outstanding changes, shown in Columns 10, 13 and 14 of the table, indicate the natural result of a heavier demand on a reduced locomotive inventory—greater individual locomotive mileage and heavier loading.

In the figure of 68.7 representing the percentage of active locomotives to total locomotives, there may be hidden implications. Not since 1929 has this percentage been so high; in that year it was 75.5. In 1929 there were 6,800 more freight locomotives than now and the number unserviceable and stored was 7,157 as compared with 6,928 in 1940. There is always the feeling that what has been done once can be done again. So, it may not be out of order to explore the results of an assumption that, if traffic necessitated, we could put our motive power in such condition that the active freight locomotives would again be 75 per cent of the total.

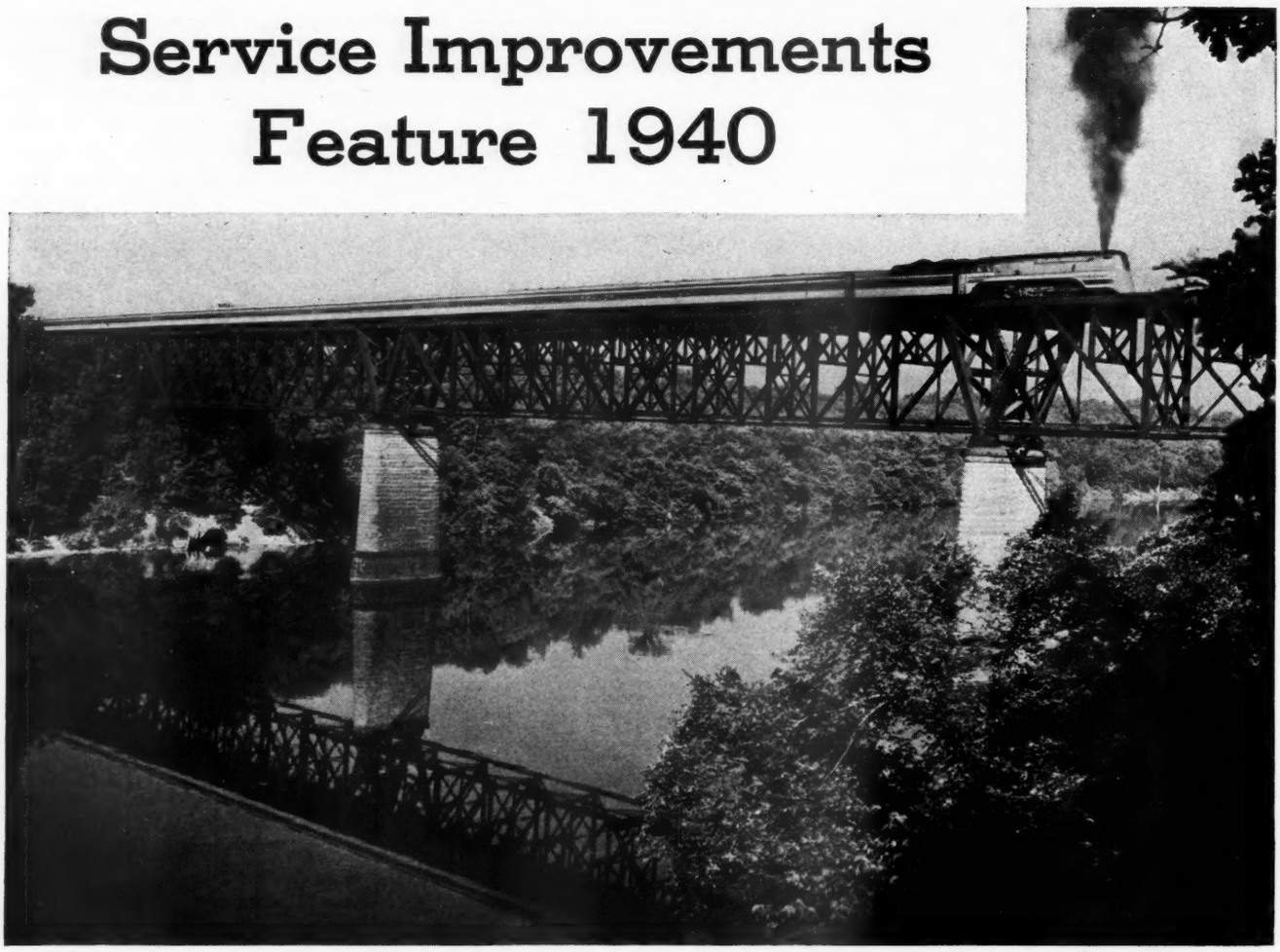
This would mean that in October, 1940, for example, the active locomotives would number 16,588—1,398 more than actually were in active service. It would also mean that the total of unserviceable and stored locomo-

It is worth while, once again, to estimate the ultimate possibilities of our present locomotive inventory in terms of capacity. It was estimated that, during the peak traffic of October, 1939, the then existing inventory could have handled a total of 103 billion gross ton-miles. That estimate was about 10 per cent greater than actually handled. On the same basis the 1940 estimate would be as follows: The number of active locomotives, at 75 per cent of the total freight power, would be 16,588. The 75 per cent is again assumed with slightly more reservation than was the case a year ago. These 16,588 active locomotives averaging 3,224 miles per month would run up a total of over 53 million locomotive-miles which at a ratio of 1.10 locomotive-miles per freight-train-mile would result in 48.6 million freight train-miles. At the 1940 average of 2,120 gross ton-miles per train-mile the potential gross ton-miles which the active locomotives could handle would be 103 billion. This is 9.7 per cent greater than was actually handled.

Estimates of the traffic peak in 1941 embrace the possibility of a four-week average car loading of about 925,000 per week. Under such circumstances October, 1941, might require about 47 million freight-train miles or only 3.7 per cent less than the estimated ultimate capacity of present steam locomotives.

No one knows whether the peak of our national defense program may be reached in 1941, or later. Regardless of when it is reached, the present narrow margin of capacity indicates a probable increase in locomotive orders during 1941. In view of the increasing evidence that the present progress of the national defense program is inadequate it would seem the better part of wisdom that the needs not only of 1941 but of 1942 as well be appraised and orders placed early in the year. Any other course may jeopardize the building up of a much needed reserve capacity.

Service Improvements Feature 1940



The Swift Streamliners Have Brought Cities and Towns Hours Closer Together

Both freight and passenger schedules speeded up to meet increasing demands by patrons for prompt service

By Charles Layng

Transportation and Motor Transport Editor

IN 1940, the pace of improvement in railway freight and passenger service continued to be accelerated. Taking into account these improvements of the last year, it may safely be said that railway service has been revolutionized in the last five years. A hopeful sign is to be found in the further fact that there is no indication of any slackening in freight or passenger progress. All signs point in the opposite direction and, in view of recent developments, predictions for the future are rendered uncertain. No one, for example, would have dared to predict the present fast freight and passenger schedules when writing about the railway situation five years ago; yet these improvements have been made in the face of continued adverse business conditions and when the financial situation of the railways was none too good. The only safe prediction for the future can be based on the fact that railway traffic and operating executives are thoroughly awake to the necessity of giving the public the finest service possible.

In other words, shippers and passengers who are now enjoying the best railway service ever afforded them, may confidently expect still better service in the future.

Railway service as it relates to the national defense program came into startling prominence during the year. The railways were called upon for their specialty—mass transportation—and responded better than even the optimists dared hope. The movement of large bodies of troops, of freight for our own defense program and war materials and supplies for Great Britain has been handled without a hitch, even though the movement through the ports is approaching 1917 and 1918 volume. Credit must be given not only to the individual railways but also to the American Association of Railroads which, through port committees and military transportation committees, established the necessary co-ordinating agencies between the government, the shippers and the various other agencies involved to insure prompt, smooth movement, without car shortages or terminal delays. A constant watchfulness promises to permit the present healthy sit-

uation to continue indefinitely, despite further increases in traffic.

The Passenger Picture

In every respect, 1940 was an outstanding year in passenger service improvement. More new streamlined trains were installed than ever before and the number now on order also breaks all records. A total of 27 new streamlined trains were installed during the calendar year and 17 more are now in the course of construction, including the largest streamliners yet built. In addition to the new streamlined trains, many modernized trains, involving complete rebuilding jobs in some cases, were also inaugurated during 1940.

The roads with established fleets of streamlined trains, without exception materially augmented these fleets in 1940, either by the purchase of new trains or new cars or both, while a number of roads not previously operating such trains became converts during the year. Improved types of Pullman accommodations were made available, and sold, in large numbers. Coach-sleepers were placed in experimental service for the first time, while the de luxe coach trains were augmented or refurbished in every instance. De luxe coach accommodations, with reclining seats, new lighting, and lounge cars for the exclusive use of coach passengers were also made available during the year on several trains not previously having such accommodations.

An increased variety of all-expense tours were also made available to the traveling public. These proved popular not only with the casual vacationist but also with habitual travelers to Europe, who were confined to the United States this year and who are accustomed to travel in this manner. The travel-on-credit plan, the train-auto and the train-taxi service were among other refinements in passenger travel introduced this year.

The expected increased volume of passenger traffic this summer because of the cessation of travel to Europe did not materialize to the extent anticipated. The sudden and alarming war developments at the beginning of the vacation season were largely responsible for this. Even so, a satisfactory number of passengers moved and the transcontinental streamliners maintained their high average earnings per mile. Florida travel materially increased during the winter season immediately after the first of the year, amply justifying the new services installed by the Florida lines. The summer travel to Florida also showed the effects of the promotion of the coastal cities as summer resorts by the railways, tour bureaus and chambers of commerce. November, 1940, business showed an 18 per cent increase over last year and all indications point to a banner passenger season which will more than justify the new and augmented trains installed in the Florida service this season.

Freight Progress Marches On

Less spectacular than the passenger schedule improvement, perhaps, but more important to the shipper and to the nation's industries, has been the continued improvement in freight schedules. The cutting of 24 hr. in freight movement between points has become almost commonplace, so frequently has it occurred recently, but mention must be made of the reduction of a full day in schedules between Chicago and the Pacific Coast, as these transcontinental schedules are of vital concern to industries everywhere. The Chicago-Texas schedules are also among those that have been materially improved.

Through package car loading received much careful study during 1940. The days when a railway could set up a package car schedule and leave it unchanged for three or four years are definitely over. With the coming of the depression, the number of package cars operated was materially reduced in the interests of heavier loading and greater utilization of freight cars. Naturally, this brought about many instances of slower service as the railways, in view of the radically reduced traffic, had no choice but to place economy ahead of service in considering the problem.

Recently, however, and particularly in 1940, this policy of drastic curtailment of package cars has undergone a change. While considerations of adequate loading and operating economy are by no means lost sight of, the increasing l. c. l. traffic and the faster train schedules make it possible to re-establish package cars in many in-

Ticket Offices Have Followed the Trend of Modernization

One of the New High-Speed Trains Finishing an Overnight Run of More than 400 Miles

stances, thus meeting the demands of service without sacrificing operating economy. As a matter of fact, many roads have found that not only are the interests of service better protected through the loading of off-line package cars, but savings are also effected in avoiding the costs of handling in the junction freighthouse, transfer across town and re-handling in the freighthouse of the connecting line.

The handling of everything from coal, to perishables in l. c. l. lots, has been made the subject of continuing study and service improvements have been the rule on all traffic handled. The fleet of "hot-shot" freight trains is continually increasing as increased traffic on such trains indicates that they are fertile sources of revenue. The wishes of the shippers seem to have solved the frequently conflicting problems of maximum tonnage versus fast service. Of course, the ideal and economical operation is to hold cars until a train can be built up to the maximum capacity of the motive power and physical structure of the railway. This served the purpose admirably when the railways had a virtual monopoly on transportation, but it does not serve the purpose today. The shipper has a drastic and effective answer now when his service demands are not met—he uses a competing form of transportation.

A nationally prominent industrial traffic manager recently stated that, in high-speed merchandise trains, flexible co-ordinated service, prompt movement through terminals, etc., the railroads are giving the shipper what he wants. He complained, however, that not all of the railroads are doing all of these things. If the developments of the past year are a criterion, it will not be long before the shipper will have exactly what he wants in the way of excellent railway service everywhere he wants it.

The Interior of the Square-End Observation-Lounge Car Built for the Seaboard Air Line by the Edward G. Budd Manufacturing Company

Decline in Freight-Car Supply Checked in 1940

(*Continued from page 15*)

national defense, in other words, comfortably superimposed upon a program of "business as usual." It is becoming every day more evident that this program is going to be speeded up, with exactly what effect on total production and total transportation demands no one can tell. But that it will increase rather than decrease these demands is highly probable.

It must be remembered that these estimates are based on data for the Class I railways of the United States as a whole and represent the maximum demands on these railroads considered as a single system. Actually, they conceal many varying situations on individual railroads and it is these situations which lead to the purchase of cars. While during 1940 there were no recorded shortages, there was throughout the year a constant succession of tight spots which, no doubt, were prevented from becoming more acute by the vigilance and prompt action of the A. A. R. Car Service Division. Such a succession of tight spots may be expected to continue during the intensification of the demand arising from the defense program and may result in shortages even though the fall peak should drop somewhat below the maximum estimated.

Construction and Maintenance Must Increase To Keep Pace

By Neal D. Howard
Engineering Editor

Review of construction and maintenance activities of the railways since 1925 show that, in spite of increased expenditures in both 1939 and 1940, still larger expenditures must be made on the fixed properties of the roads if they are not to obstruct the progress being made in equipment, service and operating economies.

MEASURED by activity and expenditures, railway construction and maintenance were on the upgrade during 1939 and 1940 from the low levels of the depression, but in both of these years they were below the level of 1937 and far below the average level of 1925 to 1929, inclusive. In appraising the physical condition of the railways, this increased acitivity of the last two years cannot be overlooked, but, viewed from the standpoint of the needs of the railways as a whole, growing out of the severely restricted expenditures during the depression years and the largely increased demands upon their tracks and other facilities in recent years as the result of higher speeds and other fundamental changes in operating methods, the increased expenditures of the last two years must be viewed as only a start in a continuing program of strengthening and refinement of many thousands of miles of tracks, and of the repair and modernization generally of other facilities, such as yards, locomotive terminals, fuel and water facilities, and both freight and passenger stations.

Larger Demands in 1941

Adding to the needs of the railways for the strengthening and modernization of their fixed properties, growing out of the years of reduced earnings and expenditures and the enlarged demands which have been made upon their properties in recent years as the result of the generally increased tempo of operation, is the outlook for increased traffic in the year ahead, which, barring the suspension of hostilities in Europe, promises still greater demands upon the railways, with still greater activities for their construction and maintenance forces. With these larger demands and activities in prospect, due in part to government defense and aid to Britain programs, many problems will confront construction and maintenance men that have not faced them for many years. Among these will be the planning and construction of hundreds of miles of tracks to serve new cantonments and munition and armament plants; the shortage of certain materials, especially treated ties, that may develop as the result of this activity, causing delay to or the disruption of normal maintenance programs; and, in some cases, a shortage of labor, particularly mechanics, for which the rearmament program has created a large demand.

Railway engineering and maintenance of way officers are not uninformed concerning these prospects, and are fully aware that if the tracks and other fixed facilities of the railways are not to present an obstacle to the forward march of rail transportation and are to meet the increased demands in prospect for 1941, large programs of construction, modernization and maintenance of their properties must be undertaken in the year that lies ahead. In fact, many of these officers have already set

up programs to this end, not alone to modernize and strengthen their facilities as may appear necessary to permit higher speeds and the more expeditious handling of traffic, but, of equal importance, to bring about improvements that will reduce operating costs and insure that all work undertaken will be done with the greatest efficiency and economy, and with the least possible interference with train operation.

New Facilities Demanded

While the reduced expenditures of individual roads generally over the country during the last 10 or 11 years indicate clearly the serious let-up in the improvement and modernization of railway facilities since the onset of the depression, the magnitude of the curtailment in these classes of work is evidenced best in the expenditures for the railways as a whole during this period. These figures show that whereas the annual gross expenditures of the Class I railways of the country for additions and betterments to their fixed properties (not net additions) averaged $461,848,250 in the years 1923 to 1930, inclusive, annual expenditures for additions and betterments averaged only $158,386,333 in the years 1931 to 1939, inclusive, or only a little more than one-third as much.

That the railways, with such a drastic reduction in expenditures for the improvement of their plant and structures, could function with the increased efficiency that they have shown during recent years, is difficult to comprehend. It is recognized that both passenger and freight traffic were off materially during the more severe depression years, which reduced the demand on many units of fixed property, but, far offsetting this has been the revolution that has occurred in operating methods during recent years, which has not only created many demands for entirely new facilities, but which has made thousands of otherwise satisfactory facilities inadequate or obsolete.

The answer to how the railways have established their recent records of improved service and performance with such marked reductions in expenditures for capital improvements is to be found in part in more economical designs and more efficient methods of construction, but of greater importance in this regard has been the ingenuity of railway officers in adopting temporary or makeshift measures to meet newly-developed conditions with minimum out-of-pocket expense. At the same time, and in spite of the generally improved service and reduced costs of operation that have been shown by the railways as a whole, it is a recognized fact that the drastic curtailment in expenditures during recent years on most roads has held in abeyance hundreds of improvement projects which, if they could be undertaken, would have a further profound effect upon the overall efficiency and economy of railway operation.

As the result of this situation, the railways today are far behind in their requirements for modern facilities, including main tracks, sidings, passing tracks, yards, engine terminal and shop facilities, many types of railway buildings, bridges, locomotive coal and cinder-handling plants, and water pumping, treating, storing and delivery equipment. Furthermore, and of pressing importance, is the fact that, with the increasingly rapid extension of improved freight and passenger service, involving radical changes in operating methods, the requirements of the railways for new and improved facilities, adapted to these new operating methods, are expanding.

Possibly the most important and spectacular development that has ever occurred in rail transportation was the inauguration and rapid expansion of high-speed, streamliner passenger service. Beginning with the placing in service of the Pioneer Zephyr on the Chicago, Burlington & Quincy in November, 1934, this service has expanded until there are now more than 100 streamlined trains in operation in the country, with 14 additional trains already on order for delivery during 1941. Second only to this development has been the generally accelerated speed of freight trains, which in many instances now equals or exceeds the speed of first-class passenger trains of only a few years ago. Added to these developments is the longer locomotive runs of recent years, with many engine districts now two and three times as long as they were as recently as 8 or 10 years ago.

To the uninformed, these fundamental changes in train operation call for little other than possibly some refinement of the track structure, with curve reduction where it is excessive at present. It is true that these factors are vitally involved, but, far and beyond this conception of the problem, the fact is that present-day high-speed passenger and freight service, with shorter schedules and longer engine runs, affects either directly or indirectly almost every element of the track structure as to both design and layout.

Minimum curvature is, of course, of paramount importance to high-speed train operation and shortened schedules, and large programs of further improvements are being held in abeyance, awaiting only more favorable earnings before they can be undertaken. A considerable number of roads are operating light-weight streamlined trains that are capable of speeds of 100 m.p.h. and more, over tracks whose present alinement permits speeds little if any greater than prevailed formerly with conventional equipment. Obviously, these roads are not realizing the full possibilities of their new trains for meeting competition, and it is evident that they never can until the track alinement is brought into step with the equipment being operated over it.

In addition to improved alinement, the operation of passenger and freight trains at the higher speeds called for today requires a stronger track structure, including heavier rail, stronger track fastenings, a better tie condition and a deeper ballast section. Recognizing this, many of the roads that have shown the greatest progress in accelerated passenger and freight service have raised their standards for almost every element of the track structure and are working progressively to these standards, but the fact that so-called streamliners are today operating over 80-lb. rail in track ballasted with sand and cinders, is an indication of the magnitude of the work that must still be done on some roads to bring the track structure into line with modern motive power and rolling stock.

Much Yard and Terminal Work

Coupled with the increased standards of main track construction demanded to keep pace with modern methods of operation are requirements for longer and stronger turnouts to minimize points of speed restriction in otherwise high-speed territory; the lengthening, respacing and higher standard of maintenance of passing tracks and sidings, with centralized traffic control and power-operated switches, to permit higher speeds over them and meeting and passing movements without stopping; and numerous changes at yards and terminals to expedite the handling of cars at these points. Even more so than with main tracks, many roads have thus far been unable to bring these facilities into line with modern requirements because of inadequate earnings, and, as a result, they are being handicapped seriously in improving service and effecting economies.

With the increased demands for quicker deliveries, there is widespread need for revised yard layouts, revised humps and car retarder installations, power-operated switches, floodlights for safer and more expeditious night operation, and modern communication systems and messenger service. In addition, the substitution of Diesel power for steam power has called for completely new and different inspection, repair and servicing facilities at many points to permit the rapid conditioning of these units in intensive turn-around schedules. Up to the present time, the needs of the railways for such facilities have been far from satisfied, and, adding to this backlog of work awaiting attention, are the additional changes and improvements of the same character which will be called for at many points during 1941 as new streamlined trains are put in service.

Fuel and Water Stations

Equally essential to efficient present-day train operation as the modernization of the various facilities already mentioned is the readjustment of fuel and water stations to meet the new requirements brought about by longer engine runs, the enlargement of delivery facilities to shorten services stops, and the modernization of the plants themselves to insure their dependability and to reduce their operating and maintenance costs. The inauguration of longer engine runs, larger tenders and faster schedules have brought about the need for extensive respacing of fuel and water stations, many points of former peak demand having been relegated to secondary or emergency stations under the revised operating schedules, while other secondary or emergency stations have become points of peak demand. Thus, the need for new and enlarged facilities has arisen at thousands of points over the country and will continue to arise in the future as train schedules are further adjusted.

As these changes become necessary, a number of roads are availing themselves of the marked improvements that have been made in locomotive servicing facilities in recent years and, wherever possible, are grouping coal, water and cinder-handling plants so that all three services can be given to locomotives simultaneously, reducing delays at both terminals and out on the line. In the case of water service facilities, the steam pump is giving way rapidly to more modern pumps of high efficiency, with either electric or Diesel engine drive and automatic control; old-style water columns are being replaced by those with larger capacity to speed delivery; and in many cases larger storage and service tanks are being provided to insure adequate supply. Even where the relocation of facilities is not involved, many roads have found the modernization of their pumping plants highly economical and are extending this work as fast as available funds will permit.

At the same time, with longer locomotive runs and the more intensive use of power, the quality of the water delivered to locomotives has assumed increased importance, and many roads are finding that to lengthen the period between shoppings, minimize failures and improve engine performance generally, it is desirable and economical to treat waters today that were formerly considered suitable for boiler use in their natural state under less intensive train operation. Thus, as fast as conditions will permit, they are extending and further refining boiler water treatment, a practice that will be found desirable, if not essential, by other roads, as they adopt higher speeds and longer engine runs.

Buildings Have Been Long Neglected

Coupled with the classes of improvements already mentioned, which are proving essential to present-day train operation and maximum efficiency, there are many other types of improvements facing the railways in the interest of meeting competition, better service, and increased patron and community good will. Outstanding among these is improvement in their buildings, especially passenger stations, many of which are out-moded, unsightly, inefficient from the standpoint of service to patrons, and, to say the least, entirely out of keeping with the improvements that are being made in passenger train service and accommodations.

As the result of seriously reduced funds for improvements, the major part of which had to be spent on those elements of fixed property, such as tracks and bridges, to insure the efficiency and safety of train operation, railway buildings, including most passenger stations, have been neglected seriously during the last decade, in many cases even in matters of essential maintenance. Unfortunately, this has come at a time when the railways have been endeavoring to recapture passenger traffic through eye appeal in their new trains, and during a period in which radical changes have taken place in building architecture, materials and furnishings; also during a period when competitive forms of transportation are extending themselves to afford their patrons the utmost in attractive, comfortable and sanitary depot facilities.

Thus, through a combination of circumstances, many railway stations have become prematurely out-moded, un-

Expenditures for Maintenance of Way and Structures, Class I Railways

(Thousands)

	Average 1925-1929 (Inclusive)	1932	1933	1934	1935	1936	1937	1938	1939
Superintendence	$57,262	$36,552	$31,921	$33,347	$35,605	$37,357	$39,801	$38,935	$39,072
Roadway Maintenance	83,698	32,042	30,026	30,714	35,809	38,289	42,017	37,219	36,112
Tunnels	2,608	1,466	933	1,051	1,453	1,326	1,709	1,256	1,210
Bridges, Culverts, etc.	43,471	19,434	17,627	20,139	22,646	24,032	26,268	24,200	24,782
Ties	114,859	50,294	43,543	50,748	51,936	56,315	59,799	53,762	59,910
Rails	47,402	13,762	14,324	15,418	16,302	21,192	20,412	17,406	22,065
Other Track Materials	48,354	15,726	15,362	18,694	20,959	26,732	30,228	22,817	29,670
Ballast	19,379	4,969	5,814	7,538	8,357	11,992	12,362	7,744	10,343
Track Laying and Surfacing	211,067	83,407	77,025	85,641	94,033	106,072	121,113	103,420	114,932
Fences and Snow Sheds	5,831	2,135	2,047	2,412	2,260	†3,397	†3,689	†2,939	†3,235
Crossings and Signs	13,115	6,468	5,969	7,293	7,186	*	*	*	*
Buildings	79,000	24,924	24,576	31,448	33,047	41,252	47,757	34,315	41,018
Water Supply	10,444	3,952	3,749	4,441	4,497	5,860	6,182	4,672	5,207
Tools and Equipment	18,230	7,917	8,051	10,666	11,044	13,452	15,408	11,456	13,720
Injuries	5,907	2,811	2,417	2,810	2,727	3,118	3,303	2,806	2,929
Removing Snow, Ice and Sand	9,947	4,699	4,188	5,630	7,001	13,365	6,655	5,239	6,110
Miscellaneous	78,449	40,621	34,714	37,310	39,105	51,059	58,891	51,961	56,516
	$849,021	$351,179	$322,286	$365,300	$393,967	$454,810	$495,594	$420,147	$466,831

Note: Miscellaneous includes signals and interlocking, all charges for depreciation and unclassified items.

* Not shown separately since 1935.

† Includes signs, as well as fences and snow sheds.

attractive and obsolete, and in many cases offensive to patrons and communities. Recognizing this, a few roads have undertaken passenger station modernization projects during the last two or three years, but, compared with the need for such work, which in many cases is crystalizing into demands on the part of communities, the results accomplished to date have been almost negligible. More of this work must be undertaken in 1941 if conditions permit, and, unquestionably, much of it will be. It is fortunate for the railways that when this work develops, they will find their efforts and problems greatly simplified by the extensive developments that have taken place in building materials and equipment since they were last

Rail Applied in Renewal—Class I Roads

	Gross Tons		Gross Tons
1925	1,950,146	1933	403,254
1926	2,209,873	1934	631,093
1927	2,124,765	1935	582,794
1928	2,080,277	1936	921,298
1929	1,958,489	1937	1,029,861
1930	1,517,002	1938	599,752
1931	984,900	1939	878,643
1932	394,536	1940	1,000,000*

* Estimated.

in the market for these specific products on any sizable scale.

Bridges, especially in main line tracks, have not been neglected to anywhere near the same extent as buildings, and, in fact, special effort has been made to insure their safety under increased speeds and other changed operating conditions. However, there is large need for bridge renewal and strengthening programs on many roads to adapt their lines to higher speeds and heavier locomotives, a need that will continue to hold up improvements in service and economies in operations until it is met. An indication of this need is seen in the extensive program of bridge strengthening that is under way on one road at the present time, which includes more than 600 bridges on 3,400 miles of line. Furthermore, there is large need on many roads for more adequate bridge protection programs if maximum life is to be secured from these structures at minimum cost.

In summary, the picture of the fixed properties of the railways at the close of 1940 is largely one of facilities inadequate in numerous respects to meet present demands for improved service, increased efficiency and economy, and the larger needs that will arise in the future with increased traffic and the expansion of expedited passenger and freight service, which seem inevitable. This is not an altogether pleasant picture for the railways to face, but it is one that they must face if they are to continue the outstanding comeback in service and public esteem that they have been staging during recent years.

Higher Standard of Maintenance Necessary

Equally as pressing for the railways as the need for modernizing their fixed properties to meet present and prospective conditions is that of raising the standard of maintenance of their properties. In 1929, as the result of large expenditures over a period of years, the physical condition of the fixed properties of the railways was highly satisfactory, but after 11 years of the business depression, with greatly restricted earnings and seriously curtailed expenditures for maintenance of way and structures, the condition of these same properties, with the exception of a certain mileage of high-speed main-line tracks on which funds have been expended largely at the expense of other tracks and facilities, is at a definitely lower level. This must be said in spite of increased expenditures for maintenance of way and structures during recent years over the low levels of the depression, reaching an estimated total of $510,000,000 in 1940, which was larger than the expenditures for similar purposes in any year since 1931.

That a generally lower level of maintenance prevails is shown unmistakably in the records of expenditures that have been made for the maintenance of roadway and structures over the last ten years, as compared with those for the five years immediately preceding the onset of the depression. During the earlier five years, ending with 1929, these expenditures by the Class I railways of the United States (including switching and terminal companies), averaged $849,020,923 annually, whereas in the ten years from 1931 to 1940, inclusive, the annual expenditures of these same roads averaged only approximately $431,000,000, or slightly more than one-half as much annually as was expended during the earlier period.

Rail and Tie Renewals Increase

Some indication of the extent to which this aggregate deficiency is distributed among the various elements of fixed property is afforded by the accompanying table, which lists the major items of maintenance expenditures between 1932 and 1939, inclusive, compared with the corresponding average expenditures for the same items from 1925 to 1929, inclusive.

In the case of roadway maintenance, it is seen that average annual expenditures for the years 1932 to 1939, inclusive, were only $35,279,000, as compared with average annual expenditures of $83,698,000 in the earlier five-year period, a reduction of 58 per cent. In the case of bridges and culverts, the corresponding average annual expenditures for the period 1932 to 1939, inclusive, and 1925 to 1929, inclusive, were $22,391,000 and $43,471,000, a reduction of 48 per cent; for ties, the corresponding average annual expenditures were $53,288,000 and $114,859,000, a reduction of 53 per cent; for rail, the corresponding average annual expenditures were $17,610,000 and $47,402,000, a reduction of 63 per cent; for

Crossties Applied in Renewals—Class I Roads

	Gross Tons		Gross Tons
1925	82,716,674	1933	37,295,716
1926	80,745,509	1934	43,306,205
1927	78,340,182	1935	44,351,900
1928	77,370,491	1936	47,361,015
1929	74,679,375	1937	47,729,538
1930	63,353,828	1938	41,363,224
1931	51,501,659	1939	45,088,278
1932	39,190,473	1940	47,000,000*

* Estimated.

track laying and surfacing, the corresponding average annual expenditures were $98,205,000 and $211,067,000, a reduction of 58 per cent; for buildings, the corresponding average annual expenditures were $34,792,000 and $79,000,000, a reduction of 56 per cent; and for water supply, the corresponding average annual expenditures were $4,820,000 and $10,444,000, a reduction of 54 per cent.

Further analysis of rail and tie replacements during the last 16 years, including 1940 for which figures have been secured directly from the railways, is possible from the other accompanying tables showing rail and crossties applied in renewals by the Class I roads since 1925. From the table of rail renewals, it is noted that while the amount of rail laid in 1940, estimated at approximately 1,000,000 gross tons, is larger than was laid in 1939 and in 1938, and was the largest amount laid in any year since

1930, with the single exception of 1937, it was still less than half or only slightly more than half of the amount laid in any of the years 1925 to 1929, inclusive.

In the case of tie renewals, it can be seen from the appropriate table that the Class I roads inserted approximately 47,000,000 ties in 1940. This was approximately 2,000,000 ties more than were inserted in renewals in 1939, and more than 5,000,000 more than were renewed in 1938, but it was only about 60 per cent as many ties as were inserted in tracks annually between 1925 and 1929, inclusive, when tie renewals averaged 78,770,446.

Still Large Deferred Maintenance

Obviously, the foregoing figures of expenditures for maintenance of way and structures indicate a much greater accumulation of deferred maintenance than actually exists, both because of the reduced volume of traffic during the depression years, with the resulting lessened wear and tear on the properties during this period, and because of the marked advances which have been made in increasing the life of materials and in increased efficiency in carrying out maintenance work. But, allowing generously for these factors, and giving consideration to all of the less tangible elements which enter into maintenance of way and structures costs, it can only be concluded that the accrued deficiency in maintenance is still large, and must be overcome if the railways are to continue the trend toward improved, high-speed freight and passenger service, with maximum safety and greatest efficiency and economy.

It is recognized, of course, that in the large amount of deferred maintenance on the railways, many classes of facilities have been affected much more seriously than others, and that minimum evidence of retrenchment is seen in high-speed, main-line tracks. However, it is equally evident that this concentration of attention on main tracks in the interest of higher speeds, smoother riding and safety of operation has been carried out at the expense of other elements of fixed property where the factors of public opinion and safety are not involved or are less vital. While this situation is as it should have been under the circumstances, there are an increasing number of those who feel that this practice cannot be continued without serious consequences, both in unfavorable public opinion and in ultimate excessive costs for rehabilitation, and who look forward hopefully to sufficiently increased allotments for maintenance of way and structures work in 1941 to permit giving considerable attention to those facilities that have long been neglected.

Work Equipment Plays Important Part

While the development of stronger and better-suited materials, and of practices to prolong the service life of such materials have been highly important factors in the enviable record of improved service, safety and economy which the railways have built up in spite of reduced earnings and restricted expenditures, possibly the most outstanding factors in this regard have been the improved methods developed for carrying out maintenance work and the widespread adoption of power tools and equipment as an aid in such work. These developments, which have been the product of extensive study and a progressive attitude on the part of maintenance of way and structures officers and supply manufacturers alike, have affected the safety, efficiency and economy of carrying out almost every class of maintenance work, with less physical demand on labor, marked improvement in the quality of the results secured, and a general speeding up of programs.

With the onset of the depression and the drastic curtailment in the expenditures that became necessary, there were many maintenance men who feared serious consequences to the safety of train operation if the period of retrenchment was to be prolonged. And, unquestionably, such consequences would have materialized if maintenance officers and supply manufacturers had not risen to the occasion and developed materials, methods, machines and work organizations that could meet the situation.

Today, power tools and equipment are available for practically every class of maintenance work and are being used to a greater extent than ever before. While this was bound to come about as a result of the depression, it was stimulated by the 15 per cent wage increase made late in 1937, and, more recently, by the application of a higher minimum wage for maintenance of way employees under the Fair Labor Standards act, which, on a number of roads, caused a material increase in the cost of doing work by hand labor. In fact, as the result of the influence of these wage increases, many machines that could not be justified formerly on the basis of economy, have come to the fore, and many roads are now in the market for equipment on a larger scale than at any previous time.

Among the power tools and equipment available to maintenance men today are motor cars, tie tampers, adzers, power wrenches, rail cranes, spike pullers and drivers, power drills, rail grinders, earth drills, oxy-acetylene and arc welding equipment, a wide variety of ditching and grading equipment, power mowers and weed destroying equipment, bridge cranes, pile drivers, air compressors, electric generators, paint-spraying equipment, power saws, wood borers, power trench pumps, and many other units of equipment that are demonstrating economy, speed and safety in carrying out work. The latest trend in equipment, brought about largely by the inauguration of high-speed trains and generally expedited schedules, is the development and use of off-track equipment for a wide variety of work in the interest of minimizing train delays and increasing safety, and of circumventing the demands of train service employees on certain roads that they be represented on power-driven on-track equipment. Recent too is renewed interest in mechanical aids for carrying out tie renewals, which has resulted in the development of several machines which when adopted widely, hold forth the prospect of effecting large savings over present costs by hand methods.

That the railways are convinced of the economy and other advantages of work equipment for carrying out maintenance of way and structures work is evidenced in the large investment which they already have in such equipment, which is estimated at well in excess of $100,000,000, and the fact that they are adding to this equipment just as rapidly as conditions warrant and their resources permit. With the improvement in business conditions in 1937, the railways purchased more than 3,300 units of new equipment in that year, at a cost in excess of $5,000,000, and, in spite of the decline in traffic during the latter part of that year and the continued low level of car loadings and earnings in 1938, they purchased more than 1200 additional units in 1938.

In 1939, stimulated by better earnings during the first nine months, they again increased their investment in work equipment, purchasing approximately 3,500 units in that year at a cost of more than $6,000,000, and during 1940, with a continuing revival of traffic and earnings, they added further to their equipment for carrying out maintenance of way and structures work by purchasing more than 5,500 units, at a cost estimated to exceed

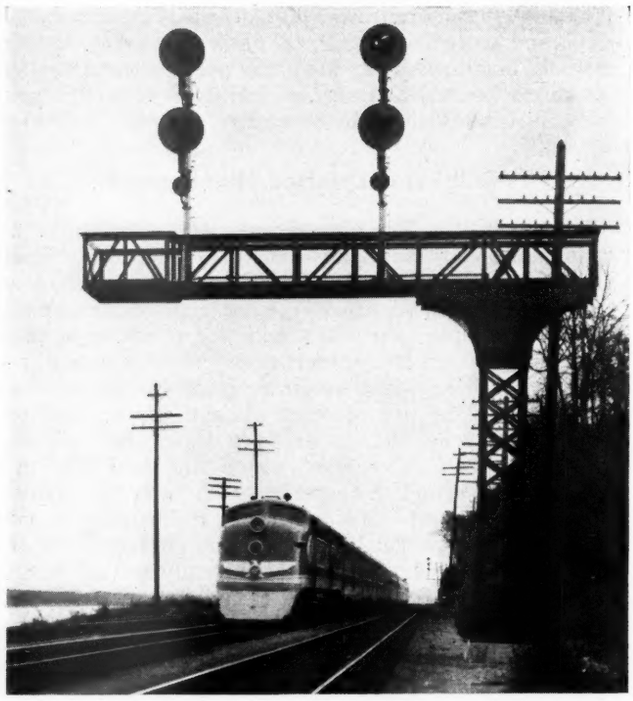
(Continued on page 54)

Keep Signaling In Step With Other Facilities

Improved train performance and economy of operation necessitate the replacement of the antiquated apparatus with modern equipment

By John H. Dunn

Signaling Editor



Centralized Traffic Control Eliminates Many Train Stops and Delays

THE majority of the railroads have improved their tracks to permit higher train speeds, and have purchased new equipment designed for higher speeds, but, with certain exceptions, the railroads have not undertaken extensive programs of modernizing their interlocking and signaling to keep them in step with other modern facilities. Yet, in the vast majority of cases, the provision of modern signaling systems will not only improve train operation but will also effect savings in operating expenses sufficient to pay for the new facilities within a few years.

A 30-Minute Stab

The important function of modern signaling is to authorize trains to *keep moving* at the maximum permissible speed at which the motive power is able to pull its train and for which the track is safe. In other words, why "run the wheels off of a train" for 50 miles, and then needlessly let it stand on a passing track for 30 min. when unoccupied track is available on which to advance it another 20 miles without delays to other trains?

In the old days, passing tracks with stations and operators were located at intervals of 5 to 10 miles. As the lengths of freight trains increased, only certain of the better-located passing tracks were extended. Some stations have been abandoned, while agent operators are on duty for only certain hours during the day at many of the remaining stations. As a result, on extensive mileages, especially on single-track lines, the blocks between open offices, particularly at night, are entirely too long to permit the flexibility in train operation required by changing circumstances. When some of the trains are running late or when extra trains are being handled, abnormal interference causes delays to mount up, and cars do not reach their destinations on time. As traffic increases, this situation will become worse, because the present shortened schedules were established when traffic was light, and train interference will increase rapidly as the number of trains grows.

Development of Recent Years

In the last several years, systems have been developed and installed on some roads by means of which a man at a central office can control signals over any portion or all of an entire operating division, so that train movements can be authorized by signal indications which supersede time-tables and take the place of train orders. Meets or passes can, therefore, be arranged with knowledge of the immediate locations of trains, thus preventing needless delays. A considerable number of roads have installed such systems of control and have included power-operated switches at ends of passing tracks, junctions and ends of double track, so that trains can pass without being required to stop to operate hand-throw switches, the system as a whole being known as centralized traffic control. An outstanding project of this character was installed in 1940 on the 69 miles of the Pennsylvania between Limedale, Ind., and Casey, Ill.

Based on data applying to several of these centralized traffic control installations, the saving in freight train time averages about 1.2 min. per train mile, and passenger trains get over the road on time. These projects, including the 18 installations completed in 1940, have as yet been confined for the most part to sections where the traffic is comparatively heavy or where such a system permits the closing of one or more outlying interlockings,

so that the savings in operating expenses can pay for the improvements in a few years.

Two factors brought forth in 1940, however, show the practicability of centralized traffic control, at least in a modified form, on the vast majority of the important main lines, especially on single track. Installations made in 1940 on the Louisville & Nashville and the Pennsylvania demonstrate that the coded circuits for centralized traffic control can be handled over two existing line wires which are used also for communication purposes. Thus the installation costs for centralized traffic control can be reduced. A second point of importance is that the increased braking distance of higher speed trains, together with interpretations which the Interstate Commerce Commission has placed on certain rules, make necessary changes in much of the existing signaling, especially on single-track lines. Many roads have met the situation temporarily by changing controls so that two or more successive signals display the Approach aspect. This results in train delays, which may not be obvious locally but give the trainmasters trouble when on-time performances are tabulated.

Kill Two Birds with One Stone in 1941

Summarizing the situation, it may be emphasized that, especially on single-track divisions now handling hot-shot freight trains as well as passenger trains, a change in practice to use normal-danger head-block station-leaving signals, controlled from a central point over existing wires by a coded centralized traffic control system, will, in one stroke, get the trains over the road on time without needless delays, and will also eliminate the features of the existing signaling which are objectionable to the I. C. C. With such a signal control system in place, power switches, also controlled from the same system, can be added as required, especially at switches on grades where trains otherwise lose too much time operating hand-throw switches.

One road, which was preparing plans for ordinary single-track signaling on a division, is now considering for 1941 a modified form of centralized traffic signal control, like that described above, and is easily able to justify the additional expense by the savings in train time which will be accomplished by the authorization of train movements by signal indications rather than by time-tables and train orders.

By this means centralized traffic control can now be justified on territory not now signaled, as well as on a large proportion of the single track now so equipped. On territory now signaled, the surprising feature is the relatively small quantity of new apparatus, time and labor required for a change-over to centralized traffic control. The cost of the additional signals for directing train movements from passing tracks will be more than offset by the elimination of intermediate signals. By confining the indications concerning the locations of trains to OS sections at the switches, the cost of the code control apparatus involved in such a C. T. C. project can be reduced to approximately $1,500 per passing track. Furthermore, by eliminating some of the intermediate staggered signals, which now serve no purpose other than head-on protection, the signals for directing following trains can be spaced on a time-distance basis, thus improving the efficiency of train operation from another angle.

Either-Direction Signals

Centralized traffic control is adaptable also on multiple-track lines where one or more tracks can be signaled for train movements in either direction, thus allowing faster trains to run around slower ones and keeping all trains moving rather than stopping them on passing tracks or in yards. An installation of this character that was completed in 1940 on 12 miles of double track through Jefferson City, Mo., on the Missouri Pacific, has relieved congestion and delays in a territory where through freight trains hold the main line while changing crews, taking coal and water, and permitting switch engines to take off or set in cars.

High Speed Interlockings

The fundamental feature which made possible the remote control of outlying signals and power switches, such as in centralized traffic control, was the development of interconnection of circuits to accomplish the necessary locking between switches and signals, as affected by trains on track circuits. With the interlocking thus accomplished at the field locations, circuits, other than those normally-closed, could be used for line controls, and no mechanical locking or electric lever locks were required in the control machines. This permitted the use of control machines with miniature non-interlocked levers which could be assembled on a comparatively small desk panel. Such machines and control systems were also installed at interlockings, the advantages being that one man seated at a desk can readily handle the levers for even a large layout, and the lineups can be changed quickly without the necessity for walking from one lever to another or waiting for indications to come in.

The next development has been to eliminate levers as such, and accomplish the control of an interlocking by buttons placed in the lines representing the tracks in an illuminated diagram. To line up a route, a button is pushed at the point representing the signal at which an approaching train will enter the interlocking, and then a second button is pushed at the point representing the track at the point where the train will leave the interlocking limits.

The switches are then positioned automatically, and the signal clears. With such an arrangement, one man can readily control what was previously included in two or more interlocking layouts, and the train operation is improved by the fact that one person has control of the entire area, eliminating the necessity for communicating between different towermen. For example, in 1940, the Michigan Central completed the installation of one of these modern interlockings at Windsor, Ont., to consolidate the control of what was previously two separate interlockings.

The rapid trend toward the adoption of interlockings in which the locking is accomplished by circuits rather than by mechanical locking between levers, is evidenced by the fact that 34 of these more modern plants were installed in 1940, as compared with 14 installations of the older type.

Power-Operated Yards

With the gradual increase in traffic during 1940, increased interest has been shown in the reduction of delays and operating expenses in freight classification yards. For example, the Louisville & Nashville recently completed a project at a yard in DeCoursey, Ky., that involved the lengthening of tracks and the installation of car retarders, power switch machines, signals, flood-lighting, and a special type of rail-carrier telephone equipment for the humpmaster to talk directly to the engineman of the hump locomotive. With these facilities, the maximum operating capacity of the yard is available at all hours, regardless of the weather, with a minimum operating expense.

Electrical Trends and Needs

Largest addition of electrical equipment to railroad service is in Diesel-electric locomotives

By Alfred G. Oehler,

Electrical Department Editor

PURCHASES of electrical equipment for railroad service follow the trend of all railroad purchases, but the percentage increases year by year. New equipment made possible largely by new materials continues constantly to broaden the field of electrical application.

Wire and Cable

Insulating materials, which will withstand higher temperatures, and which have higher di-electric strength, have effected a reduction of motor dimensions. Improved motor design has also extended the use of standardized types of motors. The new thin-wall insulations for electrical circuits are permitting the use of larger or more conductors in existing wiring channels. This may permit greater current-carrying capacity, improved regulation (less voltage drop at the motor or lamp), or reduced copper losses. In many cases thin-wall insulation will permit the making of considerable savings by increasing copper sizes above the requirements based on current-carrying capacity and voltage loss. Added improvements to distribution line characteristics are being effected by the use of static condensers. Small circuit breakers are now available, which give both thermal and load protection to No. 14 wire circuits. In the field of high-tension cables there are several new types; oil-filled, gas-filled and improved paper-insulated cable, which materially facilitate the manner in which power can be transmitted and distributed.

Motors

New machine tools are now at a premium but capacities of existing tools are being increased and convenience of operation bettered by the application of motors and improved control equipment.

For reasons of economy in first cost and maintenance, it is becoming general practice to use across-the-line or full-voltage control for squirrel-cage motors where the feeder capacity is sufficient.

Complete electrification of locomotive terminals is being studied intensively. Such studies include motor-driven pumps, induced drafting of locomotives, air-operated hammers, use of small electric heaters, low-pressure steam for the heating of buildings and heat for locomotive refill water supplied from blow-downs.

Electric Welding and Heating

The general use of heavy-coated electrodes for welding continues to further the acceptance of alternating-current welders in railroad service. To reduce the kva. demand of resistance welding machines, two different methods of applying capacitors have been introduced. In one, the capacitors are used in series with the welder transformer to bring the power factor to near unity. In the other, energy is accumulated in a capacitor bank at a relatively low demand rate, and released into the primary of the welder transformer as a high-current impulse.

Power factor correction has also been built into 300- and 500-ampere arc welding transformers, eliminating the objection of low power factor encountered with conventional welding transformers of large capacity.

"Where electrical energy is available in sufficient capacity and at a reasonable rate," says a report* of the Electrical Section of the A. A. R., "electric switch heaters have been found to be the most economical, the most efficient and the most dependable method of keeping track switches clear and in operating condition in cold weather. With the electric heater there is no open-flame fire hazard, and the possibility of personal injuries, due to persons being struck by moving equipment while working at switches to keep them clear during storms, is practically eliminated because very little, if any, attention is required when the heaters are in operation."

The introduction of thermal pliers has considerably facilitated the soldering of electrical thermal lugs and copper tubing joints. They speed soldering because of their convenience in restricted space, savings in labor costs, negligible wind disturbances and decreased fire hazard.

Lighting

Lighting is being revolutionized by the fluorescent and high-intensity mercury-vapor units. Efficiencies have been increased, costs reduced and fluorescent lamp life ratings extended to 2500 hours.

Additions and improvements in fluorescent lighting equipment include a 60-inch, 100-watt lamp, and a fluorescent powder which produces a new "soft white" color.

These new forms of light units are constantly encroaching on the field of incandescent lighting. When fluorescent and incandescent are compared for office lighting, economics favor fluorescent lighting when the cost of power is more than 2½ cents per kilowatt. In the case of shop lighting, the dividing cost line is 1½ cents. These figures relate to a new installation with all costs amortized over a six-year period. Similarly, the overall costs of a high-intensity, mercury-vapor installation are less than those of an incandescent system regardless of power costs.

Fluorescent lighting can, of course, not compete with incandescent lighting where long or medium throw units are required, such as in yard floodlighting, highway crossing lighting, locomotive headlights, etc., or where low first cost is of prime importance.

For passenger car illumination, fluorescent lighting continues to find increasing favor. There are about 10,000 fluorescent lamps now in service on passenger cars. Direct-current fluorescent lighting, employing

* Report of Committee 5—Electric Welding and Heating, Electrical Section, Division IV Engineering, A. A. R., presented October, 1940.

15-in. tubes operating on 64 volts, was introduced by the New York Central and d.c. fluorescent lighting, using 18-in. tubes on 115 volts, by the Norfolk & Western. The latter road has also equipped cars lighted with fluorescent lamps operating "cold-cathode" from a high-voltage source. Power is obtained from the direct-current power supply through a rotary converter and transformer.

Direct-current boosters are being tried to permit the use of 64-volt d. c. fluorescent lamps on 32-volt circuits. Where the car voltage is 64 or 115, fluorescent lamps are especially suitable, since they may be supplied directly from the d. c. system without conversion apparatus.

"Infra-red" incandescent drying lamps are now available for the quick-drying of lacquers. In addition to the saving of time, this method results in an improved coating, since the solvents do not have to emerge through a congealed surface in the process of drying.

Air Conditioning

Among the most recent developments in air conditioning are improved air-distribution systems, which allow for effective circulation of the air without drafts. Reheat control has been named as the ideal type of air conditioning control. In this, the cooling system operates continuously and the air entering the car is reheated. By this means a maximum de-humidification is effected and temperature is controlled by modulating or throttling control which overcomes the objections to cycling.

Two air-conditioning innovations are the ozonizer and the activated carbon adsorber units, both of which are being used in passenger cars for eliminating odors.

Electronic filters are being considered for removing fine particles of dust.

Electrical engineers agree that, with the exception of storage tracks, practically all station tracks should be equipped with standby power service for railway passenger cars. Yard requirements are adding to the need for such facilities. Three new portable chargers were introduced during the year; two of these are copper-oxide rectifiers with saturable reactor control, which convert 220-volt, three-phase a. c. power to d. c., and the third is an engine-generator unit having an engine which may be operated either on gasoline or propane.

Diesel-Electric Locomotives

The Diesel-electric locomotive has made the largest contribution of electrical equipment to railroad service in the past year and orders on hand indicate that this trend will continue. Diesel-electric locomotives in service or on order December 31, 1939, ordered in 1940, and in service or on order December 31, 1940, are shown in the table. Data included in this table consist of locomotives in service and on order on January 1, 1940, as reported in June, 1940, by the Locomotive Construction Committee, A. A. R., to which have been added orders and deliveries as reported in the *Railway Age* during 1940.

Diesel-Electric Locomotives in U. S. and Canada*

(Including Class I, II and III Railroads and Switching Companies)

In Service or on Order as of December 31, 1939

Horsepower	Switch and Transfer	Road Freight	Road Passenger	Total
300 and less	126	..	..	126
301 to 600 incl.	362	3	5	370
601 to 1000 incl.	205	13	2	220
1001 to 2000 incl.	8	..	35	43
2001 to 3000 incl.	..	..	7	7
3001 to 4000 incl.	..	..	17	17
4001 to 5000 incl.	..	..	..	..
5001 to 6000 incl.	..	..	7	7
Total	701	16	73	790

Ordered in 1940

Horsepower	Switch and Transfer	Road Freight	Road Passenger	Total
300 and less	6	..	..	6
301 to 600 incl.	141	..	..	141
601 to 1000 incl.	172	4	3	179
1001 to 2000 incl.	1	..	37	38
2001 to 3000 incl.	2	4	2	8
3001 to 4000 incl.	..	..	18	18
4001 to 5000 incl.	..	..	..	..
5001 to 6000 incl.	..	..	2	2
Total	322	8	62	392

In Service or on Order as of December 31, 1940

Horsepower	Switch and Transfer	Road Freight	Road Passenger	Total
300 and less	132	..	..	132
301 to 600 incl.	503	3	5	511
601 to 1000 incl.	377	17	5	399
1001 to 2000 incl.	9	..	72	81
2001 to 3000 incl.	2	4	9	15
3001 to 4000 incl.	..	..	35	35
4001 to 5000 incl.	..	..	..	..
5001 to 6000 incl.	..	..	9	9
Total	1023	24	135	1182

* Including other internal combustion locomotives.

Multiple-unit control has been applied to rail cars employing internal combustion engines and hydraulic mechanical drive on the Illinois Central. Each car is equipped with two engines and two drives and two or more cars may be operated from one control position. The cars are air-conditioned, electrically-lighted and are heated by electric heaters and engine jacket water.

Electric control of brakes has been instigated by the need of high-speed trains. By this means braking forces are graduated to conform with the speed and will release momentarily in case of wheel slippage.

Electrification

Equipment contracts for the electrification of the Sorocabana Railway in Brazil have just been announced. They include twenty 130-ton locomotives for main-line freight and passenger service and four 3-car multiple-unit motor car trains for suburban service. The electrification embraces 87 route miles of meter-gage track with a total of 207 track miles. The contact system will be energized with 3,000-volt direct-current power supplied through mercury-arc rectifiers.

A recent development in mercury-arc rectifiers, not yet applied to railroad service, consists of ignitron-type rectifiers in which the thyratron tubes in the firing circuits have been replaced by a magnetic, static excitation circuit.

Domestic orders for straight electric locomotives in 1940 include one 2-unit, 1800-hp., 210,000-lb. locomotive for the Illinois Terminal, three 970-hp., 170,000-lb. units for the Nevada Consolidated Copper Corporation and nine 840-hp., 258,600-lb. units for the Phelps Dodge Company.

Foreign orders in addition to those for the Sorocabana electrification include ten 250-hp., 70,000-lb. switchers for Russia.

New knowledge of the effect of locomotive gases on metals is enabling traction engineers better to select materials for overhead construction and to mitigate corrosion. Data collected on the Illinois Central shows that the use of graphite on pantographs will reduce the wear on the contact wire from 12½ to 4½ per cent of the total allowable per year.

Communication Systems

The problem of communication between locomotives and cabooses and wayside points is being actively pursued. Installations made recently on the Bessemer & Lake Erie indicate that it is not only practicable physically but that it also offers important economic advantages.

Photo by U. S. Army Signal Corps

Scenes Such As This One, Involving the Construction of Connecting Tracks to Military Establishments, Are Now a Common Sight Throughout the Country

New Trackage—What Are the Needs of National Defense?

Construction to serve war industries and military establishments will raise activity to highest level in decade or more

By M. H. Dick

Eastern Engineering Editor

AS an essential part of the national defense program, the United States is now facing the most active year, as regards the construction of new railroad trackage, that it has experienced for more than a decade. Although much of the defense program is still in the planning stage and available information regarding the trackage requirements is largely of a fragmentary nature, sufficient data are available to demonstrate that the amount of new trackage that will be required to serve defense establishments that have already been authorized will total well in excess of 1,000 miles. The conservative nature of this figure is demonstrated by the fact that approximately 500 miles of tracks will be required to serve six munitions plants alone. Practically all of the trackage required as a part of the defense program will be in the form of sidings, connecting tracks and yard, platform and team tracks, and much of it will be located on property of the federal government.

The Reason

The need for such a large mileage of new tracks is tangible evidence of the indispensability of the railroads to the national defense and security. In the entire country there is not a munitions plant, an army camp or supply depot, an arsenal, a ship yard or even an important army air field that does not have its vital railroad connections. Indeed, the availability of railroad transportation is one of the basic considerations governing the location of practically every type of military establishment. Nor is the reason difficult to perceive, for it is the railroads that give mobility to the armed forces—that make possible the transportation of large bodies of men and great masses of war material with maximum speed and efficiency.

This is a consideration of great importance in a large country where the exigencies of national defense may require the rapid movement of armies long distances to danger points at the borders or on the coasts.

What are the defense projects that are requiring the construction of so much new trackage? Probably the largest requirements at individual locations are afforded by the plants that are being constructed for the manufacture of explosives and ammunition. Then there are many other types of manufacturing plants, such as those making airplanes, tanks and guns, which are under construction while existing units are being expanded. Also, the existing facilities at arsenals and proving grounds are being enlarged; quartermaster supply depots are being rehabilitated and extended; the army's numerous posts, camps and stations throughout the country are being rebuilt and enlarged, with many new training camps and other units being added; the navy's ship-building yards and other facilities are undergoing

enlargement; and numerous new military air fields are being constructed throughout the country.

Up to 150 Miles and More

At practically every one of these locations some railroad trackage is required, the amount varying with the nature and extent of the facility. Even the air fields, where the requirements for materials are relatively limited, are generally served by spur tracks. Considering all types of defense projects, the amount of new trackage required at individual locations ranges from a fraction of a mile to well over 150 miles. When it is considered that there are literally hundreds of different projects, the magnitude of the trackage requirements immediately becomes apparent.

Speed is a vital necessity in the prosecution of the defense program and the construction phase is being expedited accordingly. Thus, some of the track construction work, particularly at training camps, has already been completed. However, the great bulk of the work is being carried forward into the new year; it is likely that most of the construction work that has been authorized to date will be completed before the end of 1941.

Original Plans Expanded

As noted above, the projects requiring the largest amount of trackage at individual locations are those involving the construction of certain types of munitions plants. These include those that are being built for the manufacture of smokeless powder, other explosives, and small arms ammunition, and those for loading explosives in bags, bombs and shells. Already nearly a score of such projects have been cleared through the National Defense Advisory Commission, which will entail a total expenditure of more than $150,000,000, exclusive of two huge

Photo by U. S. Army Signal Corps

In Any Program of Track Construction of the Magnitude of That Required by the Defense Program, It Is To Be Expected That Mechanized Equipment Will Play an Important Part

loading plants for which cost figures are not yet available.

Although the construction contracts for many of these projects have already been awarded, the planning of the track layouts has not, in most cases, reached a point where it is possible to tell with any degree of accuracy how much trackage will be involved. This situation can be ascribed in no small part to the fact that during the period that has elapsed since they were originally projected, some of the proposed plants have been greatly enlarged, being even doubled or trebled in size, with the

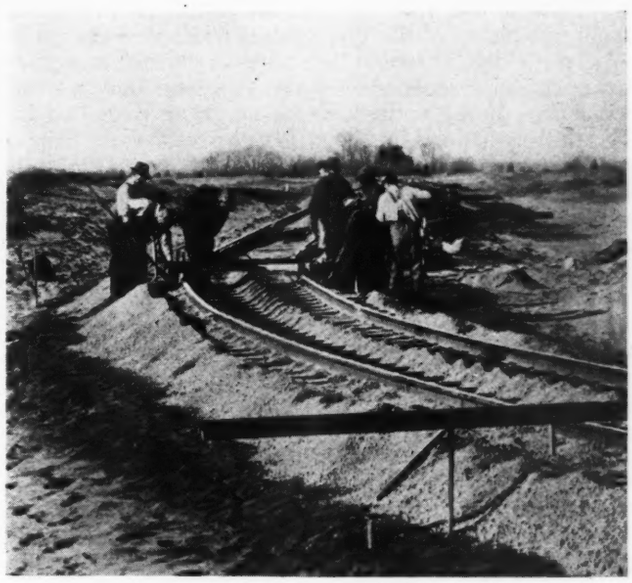


Photo by U. S. Army Signal Corps

Surfacing a Connecting Track That Is Being Built to Serve a New Defense Facility

prospect that still further changes will be necessitated by the expanding requirements of the defense program.

Illustrative of this state of affairs is the fact that in at least one instance new trackage that had already been constructed had to be torn up because of changes in the layout necessitated by the enlargement of the facility. In another case the original plans for a shell-loading plant called for a track layout that would have entailed the construction of about 35 miles of tracks, but subsequent enlargement of the plant raised the trackage requirements to about 50 miles—and now it appears that the amount of trackage will be still further increased to a total of more than 75 miles.

Reasons for Large Mileages

The extensive trackage requirements of explosive manufacturing and loading plants are due to several factors. First, such plants consume large quantities of bulky materials, and a great deal of trackage is required for receiving, handling and unloading raw materials and loading, storing and dispatching the finished products, this trackage including receiving, classification and departure yards and tracks for serving the manufacturing and storage buildings and other facilities. Second, for obvious reasons the various units comprising individual plants are spread over large tracts of land, and this factor naturally adds to the amount of trackage required.

Although it is not possible, for the reasons mentioned above, to give exact or complete figures showing the amount of trackage required at these plants sufficient data are available regarding individual layouts to give a general idea of the trackage requirements. For instance, one loading plant will require nearly 160 miles of tracks, including 658 turnouts. In another instance, involving a powder factory and a bag-loading plant, about 85 miles of tracks will be needed. Similarly one shell and bomb-loading plant will have about 55 miles of

tracks, and another plant of the same type about 75 miles. The layouts at two other plants involve 76 miles and 36 miles of tracks, respectively.

Other Munitions Plants

Although the trackage requirements at individual munitions plants of the types mentioned above are probably larger than at most other types of defense manufacturing establishments, such plants represent only a small percentage of the entire defense program, measured by the number of units involved. Exclusive of these plants, the Defense Advisory Commission has approved about fifty projects involving the construction of new factories or the enlargement of existing units. Most of these undertakings entail the expansion of existing aircraft manufacturing plants and the construction of new facilities of this type. Also included, however, are a variety of other types of factories devoted to national defense, such as chemical processing plants and units for the manufacture of army ordnance, including tanks, guns and shell casings. In addition numerous existing commercial manufacturing plants are being expanded to permit them to handle enlarged government orders.

It should be emphasized, however, that reference is made here only to those plants that are being built or expanded by agreement with the National Defense Advisory Commission; numerous additional privately-owned manufacturing plants of various types are being enlarged by the owners to permit them to handle the increased business that they expect as a result of the defense program.

While the trackage that it will be necessary to build to serve the different types of plants mentioned in the foregoing paragraphs will undoubtedly total up to a considerable mileage, it is not possible at this time to ascertain the aggregate requirements with any degree of accuracy. At aircraft factories the trackage requirements at individual locations will be limited to a maximum of a few miles, but because of the large number of these projects the total amount of trackage required at plants of this character will be considerable. At the proposed ordnance and chemical manufacturing plants, which comprise a number of extremely large projects, many miles of tracks will be required.

Arsenals, Proving Grounds, Depots

The enlargement and rehabilitation of the manufacturing and storage facilities maintained by the army and navy will account for a substantial mileage of new trackage. This classification includes arsenals, proving grounds, ordnance and quartermaster depots, navy yards and similar facilities. Here again, only scattered information is yet available regarding the trackage requirements. However, it is known that an expansion program that is now being carried out at one arsenal will require the construction of 35 miles of new tracks This same project provides another example of the fact that many defense projects are still in a state of flux and that in numerous instances the original plans have been and are being revised in the direction of enlargement. Early proposals for the expansion of this arsenal called for 25 miles of track; recent revision of the plans raised the figure to 32 miles and it has now been still further expanded to 35 miles.

As regards proving grounds, one facility of this type will require about 17 miles of trackage, not including a track 3 miles long connecting with the main line of the railroad serving it. The construction of new quartermaster and ordnance depots, and the expansion and rehabilitation of existing facilities of these types, will, in the aggregate, account also for a considerable mileage of new tracks. For instance, one new general quartermaster depot that is being constructed will have eight miles of new tracks within the reservation containing the facility, while an expansion program at another supply depot will necessitate the construction of six miles of trackage.

Army Training Camps

The construction of new army training camps comprises another important phase of the national defense program that will require a large amount of trackage. An idea of the scope of this phase of the program is obtained when it is considered that the capacity of the army's training camps, which was sufficient to accommodate only 300,000 men when the expansion program was undertaken, must now be increased to approximately 1,400,000 men. This is to be done by the construction of upwards of 30 large training camps and cantonments, each capable of housing one or more divisions. There will also be approximately 200 other army housing projects.

The number of men who will be housed at each of the training camps will range from a few thousand up to about 150,000. One of the primary requisites in the design of these camps is to provide adequate railroad trackage at each site to permit the expeditious handling of men, materials and equipment to and from the camp; hence it is apparent that the trackage requirements are substantial. At this writing, figures are available showing the trackage requirements at only a few of the camps, and among these the maximum amount of trackage needed at any one location is about 40 miles. At two other camps about 10 miles of track are being built, and in two other instances the trackage required approximates 8 miles at each location.

Frequently spur tracks of considerable length are needed to provide the necessary connection between the training camps and the railroads serving them, the connecting track in one known case being 22 miles long and in another instance 12 miles in length. If the figures cited here can be considered as constituting a criterion, it is apparent that the aggregate trackage that will be needed to serve training camps will amount to several hundred miles.

Although the amount of railroad trackage required at new army air fields is relatively small on the average at individual locations, the aggregate requirements of this phase of the defense program are by no means insignificant. To date contracts have been awarded for the construction of more than 30 air fields, at nearly every one of which some railroad trackage will be required, ranging from a fraction of a mile to 15 miles or more. Here again, connecting tracks of considerable length will be required in a number of instances, the length of this track at one new air field being about 14 miles.

Construction by Railroads

The amount of trackage that will have to be constructed by the railroads for their own use as a result of the national defense program will be substantial. In the first place, the carriers are finding it necessary in many instances to provide additional sidings and other tracks at points where spur tracks leading to important training camps and other defense establishments join railroad lines. Also, as noted previously, there are numerous instances in which private industries are expanding their properties to permit them to handle greatly enlarged government orders, and as a consequence the railroads have

found it necessary in many such cases to make corresponding increases in the industrial trackage serving the enlarged properties. That there is a considerable amount of work of this character to be done is indicated by the fact that the chief engineer on one road has delegated one of his assistant engineers to the full-time task of dealing with all problems related to providing additional industrial trackage where necessary.

Another effect of the national defense program is to require the rehabilitation of a large amount of existing trackage. In a number of instances the railroads are finding it necessary to apply extensive reconstruction and improvement measures to branch lines serving important defense establishments. Furthermore, the government is rehabilitating many miles of trackage serving existing army camps, supply depots and other military establishments that have not seen service since the World War.

The manner in which the actual work of constructing the trackage required at defense projects is being handled varies widely, being determined by the nature of the project, the method by which it is financed if it is a manufacturing plant, and by local conditions. At those defense projects that involve the construction or expansion of training camps, proving grounds, arsenals, air fields, supply depots and similar establishments, the trackage will of course be owned and maintained by the federal government. In the great majority of such cases the construction work is being handled through the Quartermaster department of the army.

Much of this work is being done by private contractors on a lump-sum or cost-plus-fixed-fee basis, depending on conditions at the individual locations. However, a considerable number of the construction projects are being carried out by the "purchase-and-hire" method, in which the Quartermaster department buys the materials directly and hires the necessary labor itself. WPA labor is being employed extensively on projects of this type.

Construction and expansion projects involving munitions plants, aircraft factories and similar establishments are, in certain cases, handled somewhat differently. Some of the munitions plants, even though they will be operated privately, will be constructed and owned by the government, and these projects are being handled by the Quartermaster department in the manner described above. Other plants, however, will be built or expanded under the terms of the "emergency plant facility contract" developed jointly by the National Defense Advisory Commission and the War, Navy and Treasury departments. Projects negotiated under this contract are to be financed, built and operated by private concerns and will be amortized over a five-year period. Obviously, therefore, the construction contracts for these projects are being awarded by the owning and operating companies in the conventional manner.

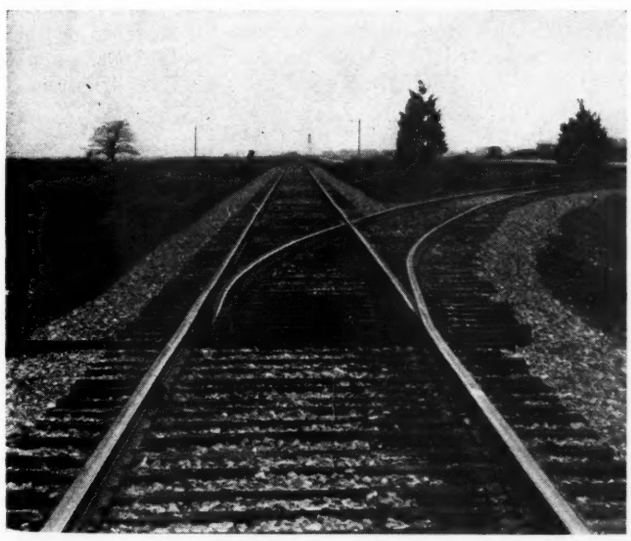


Photo by U. S. Army Signal Corps

Turnouts Such as This One, Where Spur Tracks to Defense Works Join Railway Lines, Are Symbolic of the Importance of the Railroads to the National Defense Program

Role of the Railroads

Hence, in many cases the work of constructing the railroad trackage needed at defense establishments is being performed by private contractors, and the necessary labor and materials are being acquired in the open market. But this does not mean that the railroads are not playing an important part in the track construction program. Quite the reverse is true. In not a few instances the railroads are furnishing the necessary materials and are constructing the tracks with their own forces. Also, in cases where the work is being performed by contractors or by purchase-and-hire, the railroads are furnishing literally hundreds of miles of relay rail, including joint bars in some instances. At one large munitions plant involving approximately 85 miles of track, one of the connecting railroads was asked to assume the task of providing and installing the entire track layout, but because of minimum wage requirements attached to government contracts the railroad awarded the contract to a private firm.

The railroads are probably making their greatest contribution to the program through the agency of the expert engineering advice which they are able to offer and in the form of trained supervisory personnel. Railroad engineering departments are being called on repeatedly to advise government agencies and private firms and contractors regarding the details of track layouts and standards of construction. In fact, at the request of the government many railroad engineers are being given leaves of absence to permit them to become attached to the Quartermaster department where they are rendering valuable service in general engineering activity as well as railroad work. Further, much of the track construction work is being supervised by track foremen who have been released temporarily from their railroad duties.

As to construction details and materials, the tracks at defense establishments are being built with an eye to permanence and to a generally high standard of construction. Features of the construction generally include new 85-lb. A. S. C. E. rail (where relay rail is not used), creosoted ties fully tie-plated, and gravel, stone, cinder or some other kind of acceptable ballast. Ordinarily No. 8 turnouts and rigid frogs are used.

Regarding the availability of materials, it is to be expected that, in view of the size of the program, shortages will develop in certain items. Requirements to date for track materials appear to have been satisfied in most cases without serious delay, although it is apparent that available supplies of treated ties are being depleted and this situation is causing some concern.

To summarize, while only a meager amount of specific and accurate information is available at this time, it is sufficient to justify the statement made at the outset that activity in the construction of railroad trackage during the year just ahead will be at a higher level than at any time during the last decade. Moreover, sight should not be lost of the fact that the national defense program is still in a state of flux, with further large expansion entirely possible and, therefore, that present estimates as to the amount of trackage that will be required may yet have to be revised upward sharply.

A Review of Railway Operations in 1940

By Dr. Julius H. Parmelee

Director, Bureau of Railway Economics, Association of American Railroads

UNDER the stimulus of war purchases from abroad and development of the national defense program at home, railway traffic and earnings in the United States showed almost consistent increases throughout the year 1940.

For the year 1940 as a whole, freight ton-miles increased 11 per cent over 1939, while passenger-miles increased nearly five per cent. Total operating revenues were up seven per cent, and net railway operating income showed an increase of ten per cent. While a considerable number of companies failed to earn their fixed charges—probably 30 per cent of the total mileage—Class I carriers as a whole reported a net income after charges of approximately $155,000,000.

No general changes occurred in freight rates. By order of the Interstate Commerce Commission, Eastern passenger rates in coaches were reduced in March from a maximum of 2½ cents to 2 cents per mile.

Changes in wages and working conditions were under consideration during the year, first, with respect to an increase in the statutory minimum wage of 30 cents per hour; second, in connection with a demand by certain labor groups for a vacation period of two weeks per year, with pay. Neither of these movements had been fully completed by the end of the year, although the Wage and Hour Administrator on January 2, 1941, issued an order making the recommended minimum wage of 36 cents effective as of March 1, 1941.

At Last—the Wheeler-Lea Bill Is Enacted

In the legislative field, the outstanding event was final passage and approval of the Transportation Act of 1940, which grew out of the enactment by the two branches of Congress of differing versions of S. 2009 in 1939. Congress in 1940 reenacted the so-called Hobbs-Truman bridge bill, and passed it over the President's veto. Congress also liberalized the Railroad Unemployment Insurance Act, and granted to all railway employees credit on their future annuities, under the Railroad Retirement Act, for past military service.

War, threats of war, and national defense came close to monopolizing the thought and activity of the American people in 1940. By the end of the year, no less than eight nations of Europe were engaged in hostilities, not counting Denmark, Luxembourg, and Rumania, which had been overrun by brute aggression. In addition, "undeclared war" still continued between Japan and China, to say nothing of sporadic border fighting between Thailand and French Indo-China.

Our review of railway operations in 1939, commenting on the war situation as it stood at the close of that year, said in part:

> As the largest and most powerful neutral nation, the United States in 1939 felt the impact of the war across the ocean, and seemed likely to experience even greater repercussions in 1940.

This forecast was fully warranted by the events. Occupation of the Low Countries and Rumania by Germany, with the overthrow of France as a military factor, brought the menace of aggression close home to the American people, and led to establishment of a program of national defense. This program dominated the thought of the nation, and will continue to do so to even greater extent and intensity in 1941.

Railways had their share in the defense program, and were affected by it. Certain classes of freight traffic showed marked increases as a result of the program, while other classes were adversely affected by changes in import and export movements as a result of the war.

The President on May 28 established an Advisory Commission to the Council of National Defense, and recognized the importance of transportation to national security by appointing Ralph Budd, an outstanding rail executive, as the Transportation Commissioner. Mr. Budd called to his assistance, as a consulting group on the whole transportation problem, representatives of waterway carriers, pipe lines, truck and bus operators, urban transit, domestic air transportation, and short line railroads. He also set up liaison officers with the war and navy departments, Interstate Commerce Commission, Maritime Commission, Public Roads Administration, and other governmental bodies.

While this review has no direct relation to political events, the national election of 1940 carried certain significant implications that no realistic consideration of economic developments can overlook. Re-election of President Roosevelt for a third term has increased the likelihood that for some years at least the trend in the United States will be toward more extensive governmental control over business. In addition, tax rates have already increased, and seem likely to be further increased, in a vain effort to balance the budget, swollen to unprecedented peacetime proportions by the defense program. This, together with industrial readjustments

Table I—Comparative Traffic Statistics

Revenue Carloadings (Thousands)	
1940	36,350
1939	33,911
1938	30,457
1937	37,670
1936	36,109
1932	28,180
1930	45,878
Revenue Ton-Miles (Millions)	
1940	370,000
1939	333,438
1938	290,084
1937	360,620
1936	339,246
1932	233,977
1930	383,450
Revenue Passenger-Miles (Millions)	
1940	23,700
1939	22,651
1938	21,629
1937	24,655
1936	22,421
1932	16,971
1930	26,815

that will almost certainly result from that program, contribute many uncertainties to the immediate future of transportation.

Traffic and Revenue Trends

Table I summarizes railway freight and passenger traffic in the years 1936 to 1940, also in 1932 and 1930. The entries for 1932 measure the low point of the depression period, and are included as an indication of progress since that date. The entries for 1930 represent a background of the best year in the decade from 1930 to 1940.

Revenue carloadings in 1940 aggregated 36,350,000 cars, an increase over 1939 of 2,439,000 cars, or 7.2 per cent. Carloadings, which began a generally upward trend in November, 1938, and increased throughout 1939, continued their increase in 1940 with only a few weekly interruptions.

The peak loading of 1940 occurred during the week of October 26, with a total of 837,651 cars. This peak was 2.2 per cent lower than the revised peak of 856,289 cars attained in 1939, and was also slightly below the peak of 843,861 cars in 1937.

Chart A shows average weekly carloadings, by months, for the years 1937 to 1940.

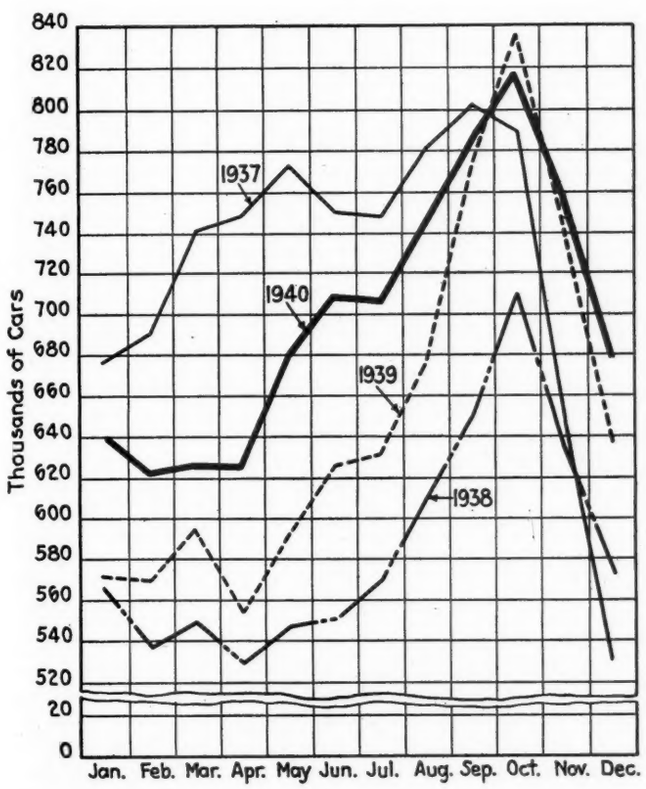


Chart A—Average Weekly Freight Car Loadings By Months, 1937, 1938, 1939 and 1940

The curve for 1940 on Chart A shows that the freight traffic ran above 1939 in each month except October. It ran above 1937 in each of the last three months, although the year's total was less in 1940 than in 1937 by 1,320,000 cars.

The chart as a whole exemplifies the wide spread that occurs every year between the low level and high level of loadings, resulting from seasonal variations in traffic. This characteristic, highly significant in its relation to the adequacy of car ownership, is considered later in this review. The low period occurs in January, February, or March; the high period occurs sometimes in September (as in 1937), but usually in October.

Table II distributes the carloadings of 1940 among the eight principal commodity groups, according to the classification of the Car Service Division of the Association of American Railroads, and sets up the corresponding distribution in 1939.

Table II—Distribution of Carloadings

	1940 Number (000)	Per cent Distribution 1940	1939
Miscellaneous	14,863	40.9	40.6
Mdse. L. C. L.	7,669	21.0	23.1
Coal	6,794	18.7	17.9
Ore	2,144	5.9	4.8
Grain and products	1,840	5.1	5.7
Forest products	1,805	5.0	4.7
Live stock	688	1.9	2.0
Coke	547	1.5	1.2
Total	36,350	100.0	100.0

Miscellaneous (or manufactures), merchandise l.c.l., and coal loadings retained their respective positions as the most important classes of rail freight. These three groups accounted for 80.6 per cent of total carloadings in 1940, compared with 81.6 per cent in 1939. Ore moved up from fifth place in 1939 to fourth place in 1940, while grain moved down from fourth to fifth. The other three groups retained their relative positions.

An outstanding feature of the railway freight traffic of 1940 was its spotty character, insofar as commodity and geographical distributions are concerned. Five of the eight principal commodity groups into which the Car Service Division classifies freight loadings showed substantial increases over 1939, while the other three showed small decreases.

The following table shows the percentage increase or decrease in each of the eight commodity groups, 1940 compared with 1939, arranged in the order of greatest percentage increase to greatest percentage decrease.

Commodity group	Increase or Decrease Cars (000)		Per cent	
Ore	Inc.	529	Inc.	32.8
Coke	Inc.	133	Inc.	32.1
Forest products	Inc.	220	Inc.	13.9
Coal	Inc.	713	Inc.	11.7
Miscellaneous	Inc.	1,112	Inc.	8.1
Live stock	Dec.	6	Dec.	0.9
Mdse. L. C. L.	Dec.	162	Dec.	2.1
Grain and products	Dec.	100	Dec.	5.2
Total	Inc.	2,439	Inc.	7.2

The greatest relative increase took place in ore and coke loadings, which were nearly one-third greater than in 1939. Forest products and coal loadings also showed substantial increases. Miscellaneous loadings, which account for about two-fifths of the total traffic, increased 8.1 per cent. Live stock and merchandise l.c.l fell off slightly. Both of these groups feel the effects of competition to a greater degree than do other commodity groups. Grain and products were affected by the export situation and showed the greatest relative decrease.

Three of the seven regions (Car Service Division classification) reported carloading increases considerably above the national average, while the other four lagged appreciably behind the average. There is a correlation between this situation and the uneven distribution of increases in the loading of the several commodities, just described.

The table at the top of the next page shows the percentage increase in carloadings. 1940 over 1939, in the seven regions, in the descending order of increase.

This table indicates that the defense program had its initial effect on the industrial East (Allegheny region, including the Pittsburgh steel area), and next on the sections producing such raw materials as coal (Pocahontas region) and iron ore and lumber (North West

Loadings Increase—1940 Over 1939

	Increase	
	Cars (000)	Per cent
Allegheny	896	13.3
Pocahontas	284	13.0
North West	517	10.7
Eastern	397	5.5
Southern	239	4.8
Central West	80	1.5
South West	26	1.1
United States	2,439	7.2

region). Other regions began to feel the quickening benefit of the program toward the end of 1940, as industrial payrolls increased and consumer buying expanded, but these developments came too late in the year to exert an appreciable influence. Such an influence should be felt in 1941.

Similarly, the several districts showed different rates of increase in total operating revenues in 1940. The rate of increase was 10.8 per cent in Eastern District (including Pocahontas Region), 5.9 per cent in the Southern Region, and only 4.7 per cent in Western District.

Revenue ton-miles in 1940 exceeded those of any year from 1931 to 1939, and were 11.0 per cent greater than those of 1939. Revenue passenger-miles were greater than in any year from 1931 to 1939, except 1937. They exceeded the total for 1939 by 4.6 per cent.

Ton-mileage in 1940 surpassed that of 1937 by 2.6 per cent, whereas carloadings in 1940 were less than those of 1937 by 3.5 per cent. A similar variance in trend occurred in 1929, when ton-miles were greater than those of 1926, while carloadings were less. Again, carloadings decreased 20.8 per cent between 1930 and 1940, whereas ton-miles decreased only 3.5 per cent. These contrasts reflect a number of traffic changes: greater proportionate movement of such heavy products as coal and iron ore, more intensive utilization of freight cars, and greater range of movement. Thus the reduction in car ownership has not affected the adequacy of the equipment in relation to freight traffic requirements.

Railroads and the National Defense Program

Railroad managements and organizations devoted much study during the year to transportation requirements growing out of the national defense program. Close contact was maintained with the Advisory Commission to the Council of National Defense and with the several government departments, with the view of planning in advance for the movement of defense materials. The Association of American Railroads, as well as individual railroads, were called upon from time to time to advise the several agencies of government upon the availability of transportation facilities in general, as well as in connection with specific movements.

The Association of American Railroads set up a Port Traffic Section in October, 1939, to facilitate and expedite the movement of cars to and from ports. This section operates through its representatives at the principal ports. So well did it perform its work during 1940 that in only one local instance was it necessary to exercise measures of control and that situation was fully cleared up before the defense program got under way.

The Troop Movement Section of the Association was reorganized and enlarged, effective August 1, 1940, and is now known as the Military Transportation Section. The section did effective work in supervising the movement of more than a quarter million men during army maneuvers in the autumn of 1940. Plans have been made for the handling of selective service men called into military service. The section also obtains information on material contracts executed by the several government agencies, in order to arrange for the prompt movement of such materials.

Adequacy of Railroad Plant

Following the outbreak of war on September 1, 1939, the United States experienced a quickening of pace in business activity. That situation gave rise to speculation as to the ability of rail carriers to handle an increased volume of traffic due to war purchases from abroad, increased commercial activity at home, and the requirements of the national defense program. Fears on that score proved to be groundless, both in 1939 and 1940.

Traffic handling problems are likely to become serious during only the period of peak traffic in any year—a period that usually lasts about six weeks. In 1937, for example, weekly carloadings exceeded 800,000 during a period of six weeks in September and October. The average weekly loading in those six weeks was 820,572 cars; for the remaining 46 weeks of that year, the weekly average was only 711,892 cars.

The contrast between high and low was even more striking in 1939. Eight consecutive weeks in that year exceeded 800,000 cars, but the first and last of the eight weeks ran so close to 800,000 that they may be disregarded here. The weekly average loading for the other six weeks was 832,525 cars. The weekly average for the remaining 46 weeks of the year was only 628,605 cars.

Traffic was distributed more evenly over the several weeks of 1940 than in 1939. Seven weeks in 1940 exceeded a loading of 800,000 cars. The weekly average for those seven weeks was 815,646 cars; the remaining 45 weeks of 1940 averaged 680,899 cars.

Thus traffic handling problems are concentrated in a comparatively short period each year, with a considerable spread between the traffic load of the peak period of a year and that of the remainder of the year. This spread is shown in the following summary table, where the average weekly loading of certain recent years is taken as a base of 100 during the lighter loading weeks, while the weekly average for the peak period is related to that base on a percentage ratio.

	Index of weekly carloadings	
	Peak Period	Balance of year
1936	120.5	100
1937	115.3	100
1939	132.4	100
1940	119.8	100

These indexes show that during the greater part of each year, when loadings are not at their peak, there exists an appreciable margin between traffic handling capacity and traffic demand. They show also that the peak period supplies the real test of handling capacity. If the increased traffic demands of the defense program are spread more evenly over the several weeks of the year than the more seasonal commercial traffic, as many think will be the case, the peak period of 1941 will offer a less rigorous test than might otherwise be anticipated.

When the railways approached the peak traffic period of 1940, their position with respect to the supply of freight car equipment was stronger than at the same period of 1939. Inasmuch as the average weekly carloadings of the peak period in 1940 ran below the corresponding average in 1939—815,646 cars in 1940 and 832,525 cars in 1939—the carriers were in even stronger relative position than the equipment supply figures, standing by themselves, would indicate. The equipment statistics were as follows, as of October first of each of

the two years, at or near the beginning of the peak traffic period; they apply only to railroad ownership.

	October 1 1939	October 1 1940	Increase or Decrease
Total cars owned	1,643,898	1,641,540	D 2,358
Bad order cars	194,890	131,064	D 63,826
Per cent bad order	11.9	8.0	D 3.9
Serviceable cars	1,449,008	1,510,476	I 61,468

No transportation shortage occurred in either October, 1939, or October, 1940, and the number of serviceable freight cars was greater in 1940 by 61,468 cars. The bad-order percentage had been reduced by December 1, 1940, to 7.0 per cent. Further reduction in this percentage, from 7.0 per cent down to 6.0 per cent, would add materially to the serviceable supply.

Both locomotive and freight car installations, as indicated elsewhere in this review, were on a larger scale in 1940 than in either 1938 or 1939.

It is difficult to forecast with certainty what traffic the railroads will be called upon to handle during the period of peak movement in the autumn of 1941. However, there has been and should be no slackening in the pace of the railroad program to increase the reserve capacity of the plant to handle adequately and efficiently such traffic volume as may develop. When the 1941 peak comes, the railways will have in service many thousand serviceable freight cars that were not available during the peak freight movement of 1939 and 1940, and should experience no difficulty in meeting the test.

Legislation in 1940

The following more important bills, in which railways have a direct or collateral interest, were enacted by the third session of the 76th Congress, which assembled on January 3 and continued in session throughout the whole year.

Transportation Act of 1940 (Public No. 785). This act, variously known prior to enactment as S.2009 and the Omnibus Transportation Bill, had a stormy passage through Congress. The Senate passed S.2009 in May, 1939. The House of Representatives passed a bill, also known as S.2009, in July, 1939. These two bills were similar in general purpose, but differed in many important respects. They were referred to a Conference Committee of the two houses on July 29, 1939. Its conference report was not submitted until the latter part of April, 1940 .

In the meantime, opposition by a number of groups, especially waterway advocates and certain elements of railway labor, grew strong enough to block favorable action in the House, where by a close vote on May 9 the report was referred back to conference. There the matter lay dormant for some time. In August the Conference Committee submitted a revised report to the Senate and the House. This report was agreed to, and the act was approved by the President on September 18. Thus did the Transportation Act of 1940 complete its somewhat tortuous path through the legislative mill.

For the first time in the history of transportation legislation, Congress made a comprehensive declaration of national policy, under which it pledged itself to treat all modes of transportation fairly and impartially.

In addition to extensive amendments to Part I and Part II of the Interstate Commerce Act, the new act added a new Part III, dealing with carriers by water. All common and contract water carriers (with limited exceptions) are subjected to Interstate Commerce Commission regulation, with respect to rates, routes, practices, etc. The act applies to carriers owned or controlled by the United States, and to carriers operating in interstate or foreign commerce, on coastwise, intercoastal, inland, or Great Lakes routes.

The Commission has set up a Bureau of Water Carriers, and has appointed George E. Talmage, Jr., of New York, as director, and Ernst Holzborn, of New Orleans, as assistant director. Both appointees have had years of experience in waterway transportation.

The act repeals certain classes of land grant rates, requiring the federal government to pay applicable commercial rates for the transportation of persons or property, except for transportation of military or naval property not for civil use, or transportation of members of military forces of the United States, or their property, when traveling on official duty. To benefit from the repeal of these land grant rates, a carrier must file with the Secretary of the Interior within a year a release of any claims against the government on account of lands granted or claimed, and a large number of such releases were filed in 1940.

Under the act, the initiative for proposing rail consolidations rests with the carriers, such proposals being subject to Commission authorization and approval. As a condition of its approval of any consolidation, the Commission is directed to require "an equitable arrangement to protect the interests of the railroad employees affected." Employee protection is limited to a period no longer than the period of employment prior to date of consolidation, subject to a maximum limitation of four years.

The Reconstruction Finance Corporation Act is amended so as to provide: (1) That the present limiting date (January 31, 1945) on maturity of loans, including railroad loans, is extended to 1955. (2) Loans may be made to receivers and trustees of railroads. (3) Interstate Commerce Commission approval is not required in cases of purchases or guarantees of railroad obligations made for maintenance or purchase of equipment by railroads not in receivership or trusteeship. (4) The revolving fund of the Reconstruction Finance Corporation for loans to railroads is increased from $350,000,000 to $500,000,000. (5) The RFC is authorized, with Commission approval, to aid in financing, reorganization, consolidation, maintenance or construction of railroads.

An important part of the new act, Title III, establishes a board of investigation and research for the purpose of investigating: (1) The relative economy and fitness of carriers by railroad, motor, and water for transportation service with a view of determining the service for which each type of carrier is especially fitted, so as to develop a national transportation system in the United States. (2) The extent to which the several classes of carriers have been subsidized by the Government. (3) The extent to which taxes are imposed upon such carriers by governmental agencies. (4) Any other matter that may relate to transportation. The President had not appointed the board, up to the end of 1940.

Railroad Unemployment Insurance Act Amended (Public No. 833). Congress in 1940 enacted a number of liberalizing amendments to the Railroad Unemployment Insurance Act of 1938, the amendments becoming effective on November 1.

Two amending bills were introduced in each house, one supported by the railways. The other, sponsored by railway labor, was supported by Chairman Latimer of the Railroad Retirement Board. All parties at interest agreed that unemployment benefits could safely be increased. They differed, however, as to the extent of such increase. The labor-Latimer group urged an increase of 115 per cent; the railways suggested a series of changes that would have increased the aggregate cost from 30 to 40 per cent. In addition, railway representa-

tives proposed that the three per cent payroll tax on the railways as employers be placed on a graduated basis, to be reduced when the assets of the unemployment benefit fund exceeded certain specified limits, and to return automatically to three per cent when the fund dropped below those limits.

The tax proposal was not adopted by Congress, and the demand of the labor groups was scaled down, so that the act as finally approved provides an increase in benefit costs estimated at 68 per cent per year.

Greater Benefits for Job-Losers

Briefly summarized, the following principal elements of liberalization were written into the act:

1. The old act required a waiting period of 15 days, for none of which a man could receive unemployment benefits. The new act reduces the waiting period from 15 to 14 days, and provides for benefit payments for every day of unemployment in excess of 7, within that period. In effect, this reduces the waiting period from 15 days to one week.

2. The old act provided that within each 15-day registration period following the waiting period, benefit payments would be made for each day of unemployment in excess of 7 days. The new act reduces the registration period to 14 days, and provides benefit payments for each day of unemployment in excess of 4 days. Now a man receives benefits for ten-fourteenths of his time, or 71 per cent, instead of eight-fifteenths, or 53 per cent.

3. The scale of daily benefits is increased, the maximum being raised from $3.00 to $4.00.

4. Weekly benefits are greatly increased. Under the old act, the weekly benefit ranged from a minimum of $6.53 to a maximum of $11.20, depending on the daily scale in each case; the new act sets the range at from $8.75 to $20.00 per week.

5. The maximum number of days for which benefits are payable within a benefit year are increased from 80, in the old act, to 100 in the new.

6. Certain other changes simplified the procedure originally laid down, such as setting up a uniform benefit year for all employees.

Railroad Retirement Act. Two pieces of legislation relating to administration of the Railroad Retirement Act were enacted by Congress during 1940. One was a joint resolution signed by the President on October 9, which requires employers under the act to collect and verify to the Railroad Retirement Board individual reports of service and compensation prior to January 1, 1937. This undertaking, which must be completed by June 30, 1943, may involve the service records of 1,200,000 individuals.

The second was enacted as a provision of the Second Revenue Act of 1940, which granted credit toward annuities for military service rendered prior to January 1, 1937. Legislation providing similar credits for military service in periods after December 31, 1936, including that under the Selective Service Act of 1940, is under consideration by Congress.

Truman-Hobbs Bridge Act (Public No. 647). Congress passed a bill (S. 1989) in August, 1939, which provided that when railroads are required by the Secretary of War to relocate or alter bridges over navigable streams, the Government would pay that portion of the expense attributable to navigation. This measure failed of final approval by reason of a "pocket veto" by the President. A similar bill (H. R. 9381) was introduced in Congress in April, 1940. Both Senate and House passed this bill, and the President vetoed it. Congress over-rode the veto and the measure became law on June 21.

Grade Crossing Elimination. The Federal Aid Highway bill, as passed by the House, authorized an annual appropriation of $37,500,000 for grade crossing elimination in 1942 and 1943. When the bill reached the Senate, this amount was reduced to $20,000,000. A conference committee report affirmed the latter figure and the measure was passed in that form, being approved by the President on September 5.

Train Wreck Bill (Public No. 575). Following the malicious wrecking of a passenger train in 1939, which cost a number of persons their lives, Congress enacted a bill making it a Federal crime to wreck, or attempt to wreck, a train. This measure was approved on June 8, 1940.

Reorganizations

A net reduction of two (from 109 to 107) took place during 1940 in the total number of railway companies in receivership or trusteeship. Of the 107 companies, 38 were Class I railways. Ten of these, operating 12,206 miles of road, were in receivership, while 28, operating 62,822 miles of road, were in trusteeship.

The following changes in status occurred during the year 1940. One Class I company (Central of Georgia) was transferred from a receivership to a trusteeship status, while another Class I company (Chicago, Rock Island & Gulf) was transferred from an operating trusteeship to a lessor trusteeship status. The Fort Smith & Western (Class II, in receivership) was abandoned, and the Collins & Glennville (Class III, in receivership) came out of receivership.

At the end of 1940, a total of 76,898 miles of railroad, of all classes, was in receivership or trusteeship, a net decrease of 425 miles during the year. This mileage represented 31 per cent of the total railway mileage of the United States.

Progress was made during the year in the reorganization of Class I companies under Section 77 trusteeships. By the end of 1940, the Interstate Commerce Commission had approved reorganization plans of 13 systems, comprising 18 of the 28 companies of Class I in trusteeship, while an examiner of the Commission had proposed a plan for one system, comprising two additional companies. This plan had yet to receive Commission approval. Thus 14 plans, covering 20 of the 28 companies, had reached the stage of final or tentative disposal by the Interstate Commerce Commission.

Court approval has been granted eight plans, of which the following five were approved during 1940: Chicago & North Western, Chicago, Milwaukee, St. Paul & Pacific, Erie, Spokane International, and W. P.

During the year the plan for the Spokane International was not only approved by the court, but in addition was submitted to creditors for approval, then given final court confirmation. Court confirmation (following creditor approval) was given also to plans for the Chicago & Eastern Illinois and the Chicago Great Western.

Under the 14 reorganization plans approved by the Commission or its examiners, the total capital structures are reduced by 20 per cent. Long-term debt, including both fixed and contingent interest debt, is reduced by 46.7 per cent. Total interest charges, fixed and contingent, are reduced by about 50 per cent.

Through the finding by the Interstate Commerce Commission that the great majority of existing stock of the reorganized companies has "no value," and is, therefore, not entitled to participate in reorganization, ownership of reorganized carriers will be transferred largely to former bondholders, through allocation to them of the stock of the reorganized companies.

Adding the face value of existing stock declared by

the Commission to be without value, and the loss sustained by those groups of stockholders whose claims are only partially satisfied, the total face value loss to existing stockholders in the 14 reorganizations will amount to 97 per cent of their present holdings, if all the plans are finally confirmed. However, appeals seem likely in at least two of the cases approved by the courts in 1940.

Stock issues are generally increased, with a marked trend toward the use of no-par common stock. The new stock, as indicated, is for the most part allocated to certain classes of the present creditors, in exchange for all or a part of their claims, or in satisfaction of accrued interest on their claims.

This determination of "no value" by Commission fiat, in addition to producing controversy in reorganization proceedings, has given rise to a number of collateral problems. When a reorganized company sets up its books under the new capitalization, what disposition shall be made of the difference between the new capital structure and the amount on the old books representing investment in the property? Shall it be considered as surplus, or shall it be written off the books, or shall it be relegated to a special account on the liability side of the balance sheet? This account, Liability Account No. 757½, is labeled "Reorganization Adjustment of Capital," and is largely an accounting entry for balancing purposes. This problem was presented to the Commission in respect to a revised balance sheet for the Chicago Great Western, and was set for hearing before the whole Commission early in 1941.

The Chandler Act of 1939, designed to permit financially weak roads to make voluntary readjustments of their capital structures without resorting to judicial reorganization, automatically expired on July 31, 1940. Six railroads (two of which were Class I companies) inaugurated readjustment plans under provisions of the act, at least five of which (including the two Class I companies) were carried out. A plan of financial readjustment developed by another Class I carrier was completed, and the Interstate Commerce Commission granted authority to that carrier to issue new securities in exchange for outstanding issues. The Commission further approved a loan by the Reconstruction Finance Corporation to meet the cash requirements of the plan.

Railway Financing

Indebtedness of the carriers to the government increased by $15,952,026 during the first eleven months of 1940.

As of November 30, 1940, the status of railway financing through government agencies was as indicated below:

Total loans (RFC and PWA)	$984,175,522
Repaid by railways	372,906,488
Balance November 30	$611,269,034
Of which there had been sold to the public at a net profit of $5,020,986	129,664,000
Still held by government	481,605,034

A total of $99,494,535 was repaid by carriers during the first eleven months of 1940, and is included in the total repayment of $372,906,488 shown above.

The Railroad Credit Corporation made one liquidating payment of one-half of one per cent during 1940 to participants in its pool. As of November 30, 1940, a total of $58,034,174, or 79 per cent, of the original loan fund had been liquidated by pro rata distributions to participants in the fund. For the most part, the companies still in debt to the Corporation are in receivership or trusteeship, and final settlement of their obligations must await the termination of reorganization proceedings.

The Competitive Situation

Competition between the railways and other forms of transport continued to increase during 1940. This was particularly true of highway and air competition. Indexes developed by the Bureau of Railway Economics show that the total volume of commodities moving from producer to consumer in 1940 averaged 92 per cent of the volume of 1928. On the other hand, the amount of traffic handled by the railways in 1940 averaged only 78 per cent of the 1928 level. This indicates a loss or diversion of freight traffic from the rails to other agencies of 14 points, or 15 per cent, between 1928 and 1940.

The American Trucking Association's index of revenue freight moving by motor truck stood at 133.5 for 1940 (1936 being taken as 100), compared with 123.6 in 1939. Corresponding indexes for rail shipments were 104.4 in 1940 and 95.7 in 1939. According to these figures, truck loadings showed an increase in 1940 of 33.5 per cent over 1936, while rail shipments showed an increase of only 4.4 per cent.

Nearly 860 intercity common or contract carriers of freight reported to the Interstate Commerce Commission comparable statistics of operation for the first six months of 1940 and 1939. These statistics showed that truck and tractor miles operated increased 16.6 per cent, and tons of freight transported increased 18.5 per cent, in the first six months of 1940. Operating revenues increased 14.3 per cent, while net operating revenue increased about one per cent.

Reports to the Commission of intercity motor carriers of passengers, for the first six months of 1940, showed an increase of 5.0 per cent in bus miles operated and an increase of 15.6 per cent in number of revenue passengers carried, compared with the corresponding period of 1939. Operating revenues increased 3.5 per cent, while net operating revenue decreased by almost 24 per cent.

Domestic air carriers reporting to the Civil Aeronautics Board showed marked increases during the first eight months of 1940. The number of plane-miles flown increased 32.5 per cent over the comparable 1939 period, while revenue passenger-miles increased 61.5 per cent.

Large carriers by water reporting to the Interstate Commerce Commission showed an increase of 9.1 per cent in number of tons of revenue freight carried during the first nine months of 1940. Freight revenue increased 3.5 per cent.

The Federal Barge Lines, owned and operated by the Federal Government, reported an increase of 11.0 per cent in tonnage and an increase of 14.2 per cent in freight revenue, during the first nine months of 1940.

Departing somewhat from the procedure of previous years, Congress restricted Federal appropriations for river and harbor improvements largely to projects deemed essential to national defense.

Oil pipe line companies reporting to the Interstate Commerce Commission, for the first nine months of 1940, showed an increase of 18.4 per cent in number of barrels of oil handled. Consumption of natural gas, which was at its peak in 1939, showed a further increase of 10.5 per cent during the first eight months of 1940. The Federal Power Commission has before it several applications for certificates to authorize new construction of natural gas lines into communities in eleven states.

Production of electrical energy, which was at record levels in 1939, increased again by 11.6 per cent during the first nine months of 1940.

Joseph B. Eastman released to the public in 1940 the

long-awaited report begun by him while Federal Coordinator of Transportation, entitled *Public Aids to Transportation.* It occupied four quarto volumes aggregating 1,134 pages. In addition to a general comparative analysis, the report covered public aids to scheduled air transportation, to railroads, to waterways (including the Federal Barge Lines), and to motor transport.

That section of the report which concluded that commercial vehicles operating on the highways receive little or no subsidy stimulated immediate controversy. The Association of American Railroads issued an octavo volume of 213 pages, analyzing the whole Eastman report, devoting particular attention to the inconsistent treatment accorded the various agencies of transport, and strongly criticizing the section on motor vehicles. The analysis specifically challenged Mr. Eastman's conclusion that the fifteen-billion dollar cost of highway improvement and maintenance from 1921 to 1937, and not financed from motor vehice payments, did not constitute public aid to motor vehicle users.

The following quotation from the A. A. R. analysis is illustrative of its general findings with respect to the Eastman report:

> The issues involved in this report, highly controversial in character, are fundamentally important to the railroads and they expected these issues to be met with careful and objective treatment.
>
> In this expectation the railroads are disappointed. The treatment of the different agencies of transportation in the reports is inconsistent. This inconsistency renders the conclusions incomparable, confusing and misleading.

Motor Carrier Regulation

The Commission's Bureau of Motor Carriers was active during 1940 in rate, consolidation, application and enforcement matters, and other regulatory duties imposed by the Motor Carrier Act. Applications for certificates, permits, etc., continued heavy, averaging about 300 per month. A number of supplemental orders were issued in connection with ex parte rate proceedings in New England, Central States, and Southeastern areas.

Hearings were completed on the proposed merger of a large number of motor carriers operating in the East into a single operating company to be known as The Transport Company. A proposed report in the matter by J. Edward Davey, Chief of the Section of Finance, was on the whole favorable to such merger, although there were some denials and dismissals of certain specific proposals. The Commission later denied the application.

Railroad Retirement

By order of November 8, 1937, the Commission directed the Bureau of Motor Carriers to assemble data with respect to sizes and weights of motor vehicles and combinations used by common and contract carriers, for the purpose of determining whether or not there is need for Federal regulation in the matter. Five reports dealing with various phases of the subject were released during 1940, with several yet to come. By order of August 28, 1940, the Commission invited interested parties to file a statement of their positions in the proceeding, following which the Commission would determine whether a public hearing was necessary. The Association of American Railroads and the American Short Line Railroad Association filed a joint statement on November 25, 1940, pointing out reasons why Federal regulation of sizes and weights of motor vehicles moving in interstate commerce is neither necessary nor desirable in the public interest.

As of November 30, 1940, a total of 148,884 persons were on the annuity and pension rolls of the Railroad Retirement Board. This was a net increase of 11,249 over the same date in 1939. Aggregate annual benefit disbursements as of November 30, 1940, amounted to $113,171,000, which was $9,225,000 greater than the comparable amount for 1939. Retirement tax collections for the twelve months ended November 30, 1940, aggregated $124,074,000, and the cost of administering the act during that period was $2,861,000.

The number of pensioners, transferred from the voluntary pension rolls of the carriers in 1937, continued to decline (by reason of death) at a rather rapid rate in 1940. The number of these pensioners transferred as of July 1, 1937, was 48,500, and the monthly amount payable to them was $2,808,370. As of November 30, 1940, the number had been reduced to 33,609, and the monthly benefit amount to $1,974,901. Annual disbursements on this account were, therefore, $10,002,000 less than at the initial date of transfer.

The following tabulation is a condensed statement of retirement tax accruals, interest, and expenditures from January 1, 1937 to November 30, 1940.

Tax accruals		$433,000,000
Interest		5,895,000
		$438,895,000
Less:		
Benefit payments	$348,423,000	
Administrative expenses	11,142,000	359,565,000
Balance		$ 79,330,000

The balance of approximately $79,000,000 is represented in part by taxes accrued but not yet collected, and the unexpended balance of appropriations. As of November 30, 1940, the Board had a reserve of $85,400,000 invested in 3 per cent Treasury notes. That this amount is in excess of the balance just referred to is explained by the fact that appropriations to the Railroad Retirement Account have exceeded tax collections.

Tax accruals in 1939 and 1940 ran below the amounts estimated by actuarial experts at the time the Railroad Retirement Act was drafted in 1937, while benefit payments considerably exceeded the estimates made at that same time.

The Railroad Retirement Act directs the Railroad Retirement Board to have an actuarial appraisal of the potential assets and liabilities of the railroad retirement system, at least once every three years. An actuarial advisory committee makes the appraisal, the committee consisting of one expert actuary designated by the railways, one by railway labor, and a third assigned from the Treasury Department. Such a committee functioned during 1940, and reached the startling conclusion that to place the retirement system on a sound financial basis for the future, the combined payroll retirement tax should be increased to and maintained at approximately 11 per cent, one-half of which would presumably be paid by the employers and one-half by employees. The current combined tax rate is 6 per cent, divided between employers and employees, and under the present retirement taxing act rises to an eventual rate of 7½ per cent, also equally divided.

In submitting the committee's report to Congress, the Railroad Retirement Board recommended that no immediate change be made in the tax rate, subject to further actuarial appraisals in the future.

Railroad Unemployment Compensation

The Railroad Unemployment Insurance Act was subjected to radical changes during 1940. These changes, which have already been detailed in the section of this review dealing with legislation, greatly liberalized the benefits and will increase the aggregate annual cost of

such benefits by 68 per cent. The liberalized benefits became effective on November 1, 1940.

Unemployment benefits during the first year of the act, ending June 30, 1940, aggregated $14,807,000. Administrative expenses during the same period totaled $4,178,000. During that same period of twelve months, tax accruals for unemployment compensation, assessed on employers at the rate of three per cent on payrolls, approximated $60,000,000. In addition, the Railroad Retirement Board expects to recoup, from state unemployment balances under the Social Security Act, a sum variously estimated, but believed to be not less than $100,000,000. Thus the Board, on July 1, 1940, had to its credit or in prospect a reserve of approximately $141,000,000, equivalent to more than twice the annual tax accrual. This sum is derived by adding $100,000,000 and $60,000,000, and deducting the $19,000,000 expended for unemployment benefits and administration.

The fiscal year just summarized was, of course, one of rising railway employment, and the drain on the unemployment benefit fund was correspondingly light. Average monthly employment during that year, ending June 30, 1940, was 1,011,383, compared with 953,121 during the next preceding fiscal year, an increase of 58,262 men, or 6.1 per cent. In fact, whereas rail employment did not equal a million men in any month of the twelve months ended June 30, 1939 (the peak employment in that period being 993,461), the million mark was exceeded in eight of the twelve months ended June 30, 1940, with a peak of 1,055,786 men in October, 1939.

Employed men do not draw unemployment benefits. Only when employment begins to decline, either for seasonal or traffic reasons, do claims for benefits increase in number and amount, and then they increase rapidly and constitute a real drain on the benefit fund. For this reason, experience thus far had under the Railroad Unemployment Insurance Act does not supply a real guide as to future costs and expenditures.

Rates, Fares, and Traffic Developments

The following were the principal developments, during 1940, in the traffic field.

Railroads decided to continue the so-called "grand circle" fares for another year, until October 31, 1941. The plan was used by 32,500 persons during its first year. Under it an individual can travel by rail from his home to both Atlantic and Pacific coasts, thence to his original starting point, at a substantial reduction from standard rates. He has his own choice of routes. The rail rate is $90 for the round trip in coaches, $135 in Pullman cars, and the Pullman Company offers special berth rates to Pullman passengers.

The Interstate Commerce Commission refused to permit Eastern railroads to continue the basic passenger coach fare of 2.5 cents per mile after March 24, and ordered the fare reduced to 2 cents per mile from that date.

Effective May 1, 1940, sixty-six railroads joined in a plan to sell passenger transportation on an instalment basis. The railroads made arrangements with the Travelers Credit Corporation, whereby that corporation advances the cost of a proposed trip, of $50 or more, upon application and approval for credit.

American railroads established special reduced round-trip fares covering Christmas holiday travel of the uniformed personnel of the Army, Navy and Marine Corps. Rates of one cent per mile in coaches between all points in the United States were made available to members of the nation's military forces, traveling in uniform on furlough at their own expense. This innovation was regarded as an appropriate salute to the members of the nation's armed forces.

No general freight rate adjustments were made during 1940, although substantial reductions were made in ratings on L.C.L. traffic within Southern territory and interterritorially between Southern territory and Official territory; also southbound from Western Trunk Line territory to Southern territory.

The Commission continued its investigation under Dockets I. C. C. 28300, 28310, and M. C. C. 150. These involved rail and motor classifications, and railroad class rates over the whole area of the United States east of the Rocky Mountains. On May 28, 1940, the railroads petitioned the Commission to investigate motor class rates. Such an investigation was ordered by the Commission on August first, in M. C. C. 200.

Several committees of the carriers continued their work of simplifying and standardizing traffic procedure. The Merchandise Committee submitted a number of recommendations to the three territorial traffic associations, with particular reference to rates, rules, and regulations applicable to merchandise traffic, designed to meet present-day conditions and retrieve traffic diverted to other agencies of transport. Some of these were adopted, while others were referred to the territories for separate attention.

The Classification Simplification Committee also made substantial progress, which will greatly simplify the subject matter in the classifications. The new classifications became effective on December 31, 1940.

The Committee on Freight Tariffs has continued its program of issuing recommendations for the improvement of tariffs, so that they may be more readily utilized. A number of these were published in August in Traffic Circular, A. A. R. No. 4. As these recommended practices are adopted, future tariffs will represent a forward step over those now in effect. A petition was filed in October for modification of the Commission's posting order of October 12, 1915. If the relief requested is granted, the number of tariffs required to be filed at stations will be materially curtailed, thus reducing total tariff expense.

Material and Supply Costs

The index of average unit prices of railway material and supplies developed by the Bureau of Railway Economics stood at 135.2 in December, 1940 (the average for May, 1933, being 100), compared with 133.1 in December, 1939. During the first half of 1940, material prices showed a downward trend, but an upward swing during the latter part of the year more than offset the previous decline. Price indexes for various dates since May, 1933, are as follows:

	Material and supplies (Other than fuel)	Fuel (Coal and oil)	All Material
May, 1933	100.0	100.0	100.0
December, 1935	118.5	127.7	121.7
December, 1937	136.7	141.5	138.3
December, 1938	127.8	133.8	129.9
December, 1939	132.7	134.0	133.1
June, 1940	130.7	134.7	132.1
December, 1940	134.6	136.4	135.2

The unit price of material and supplies (other than fuel), as of December, 1940, averaged 34.6 per cent higher than in May, 1933, and 1.4 per cent higher than in December, 1939.

The weighted average price of coal and oil combined showed an increase of 34.0 per cent from May, 1933, to December, 1939, and a further increase of 1.8 per cent from December, 1939, to December, 1940.

The average price of coal per ton, at point of purchase or production, increased from $1.51 in May,

1933, to $1.97 in December, 1939, and to $2.01 in October, 1940. Since October 1, 1938, the Bituminous Coal Commission (now the Bituminous Coal Division of the Interior Department), acting under authority of the Bituminous Coal Act of 1937, has held extended hearings which led to the establishment of minimum coal prices, effective October 1, 1940.

Railway Taxes

Railway tax accruals in 1940 amounted to $405,000,000, or more than $1,100,000 per day. Compared with $355,678,000 in 1939, this was an increase of 13.9 per cent, and was the largest railway tax bill on record. The next largest annual tax bill of Class I railways was met in 1929 and amounted to $396,683,000.

Payroll tax accruals in 1940 amounted to $117,000,000, compared with $105,551,000 in 1939, an increase of 10.8 per cent. This total was divided almost exactly between the two classes of payroll taxation, for retirement and for unemployment compensation.

The payroll tax rates levied on railway companies as employers increased over those for 1939. The 3 per cent for unemployment compensation remained the same, but the employer's share of the tax for railroad retirement increased from 2¾ per cent to 3 per cent. Thus the combined payroll tax rate increased from 5¾ to 6 per cent. The increase in payroll taxes in 1940 was due in part to this higher tax rate, and in part to increased employment and greater payrolls.

Railway taxes other than those levied on payrolls increased from $250,127,000 in 1939 to $288,000,000 in 1940, or 15.1 per cent. Among other things, this reflected an increase in accruals of gross revenue and income taxes occasioned by increased earnings, as well as the increased Federal income tax rates levied by Congress during 1940.

Total tax accruals per dollar of operating revenue averaged 9½ cents for the year 1940. This compared with a lower ratio of 8.9 cents per dollar in 1939, and was equal to the ratio of 1938, the highest in railroad history.

Other Developments

The Southern Pacific Company is making a second attempt to test the constitutionality of the Arizona Train Limit Law. Hearings began before the Superior Court of Pima County, Arizona, in late November, 1940, and were still in progress at the close of the year. A previous attempt to have the law set aside was frustrated in the U. S. Supreme Court several years ago by a legal technicality, after the railroads had obtained a favorable decision in the lower court.

No change occurred during the year in the status of the Louisiana Train Limit Law of 1936, or the Oklahoma Train Limit Law of 1937, the enforcement of each of which has been temporarily enjoined.

One change took place in the membership of the Interstate Commerce Commission during 1940. Marion M. Caskie resigned, and was replaced by J. Monroe Johnson, formerly Assistant Secretary of Commerce. Commissioner Miller began a new seven-year term on January 1. Commissioner Splawn, whose term expired on December 31, was reappointed for another seven-year term, beginning January 1, 1941.

The Attorney General's Committee on Administrative Procedure made public in May its Monograph No. 17, covering the activities of the National Railroad Adjustment Board and the National Mediation Board. The Committee invited criticism and discussion. At a public hearing in June, a legal committee representing Class I railroads presented a series of recommendations covering suggested procedural rules to govern the work of the Adjustment Board. Principles recommended as essential to proper procedure before the Board included: uniformity of procedure before all divisions of the Board; the basis and reasoning upon which each award is made should be prepared and published; a reasonable time limit should be fixed with respect to claims seeking retroactive awards; means by which controverted issues of fact may be determined should be established, with provision for preservation of evidence for consideration by the Board and the referee; submissions should be presented to the Board in a statement containing full information with respect to the agreement and facts relied upon to sustain the claim, with opportunity for reply by the other party prior to the hearing.

A second and similar report—Monograph No. 24—was issued in July, pertaining to the work of the Interstate Commerce Commission. It contained few criticisms or suggestions, but pointed out that the Commission's methods of procedure in some cases seemed too "legalistic," and suggested that a more informal pattern of hearings would expedite Commission business. A hearing followed the issuance of the report.

The National Resources Planning Board, which functions in Washington as a part of the Executive Office of the President of the United States, inaugurated a transportation study late in 1939. This was carried on during 1940 under the supervision of an advisory committee consisting of certain government officials, with Owen D. Young as chairman. The announced plan was to bring together research material already available with respect to all forms of transportation in the United States, and to put it into the form of a usable report. The committee expects to issue a preliminary report early in 1941, and its final report by the middle of 1941.

The Association of American Railroads inaugurated a number of open meetings, in conjunction with its own annual meeting in New York in November, at which representatives of the government, of industry, and of labor discussed various elements in the transportation situation, with suggestions for improvement.

Principal Operating Factors

The following summary compares the statistical results of railway operation in 1940 with the corresponding results for 1939. Detailed analyses of the several factors follow the summary. All the statistics in this and succeeding statements relate to railways of Class I, and are subject to revision when final reports of the carriers become available for the year 1940.

1. Freight traffic (ton-miles) in 1940 increased 11.0 per cent over 1939, while passenger traffic (passenger-miles) increased 4.6 per cent.

2. Operating revenues in 1940 increased 7.0 per cent over 1939. Freight revenue increased by 8.3 per cent, while passenger revenue showed a decrease of 0.5 per cent.

3. Total operating costs (operating expenses, taxes, and operating rentals) amounted to $3,625,000,000 in 1940, compared with $3,406,000,000 in 1939, an increase of 6.4.

4. Railway taxes increased by nearly $50,000,000, or 13.9 per cent, bringing the total up to the largest tax figure in railroad history.

5. Net railway operating income amounted to approximately $650,000,000 in 1940, an increase of 10.4 per cent over 1939. Thus revenues increased by $280,000,000, of which all but $61,000,000 was absorbed by increased expenses and taxes.

6. Net income after fixed charges amounted to approximately $155,000,000 in 1940. This compares with a net income of $93,000,000 in 1939 and a net income of $524,000,000 in 1930.

Chart B reduces the six factors appearing in the fore-

going summary to an index basis. The chart includes a comparison of the years 1937 to 1940, and the comparative totals for 1930 are in each case taken as equivalent to 100.

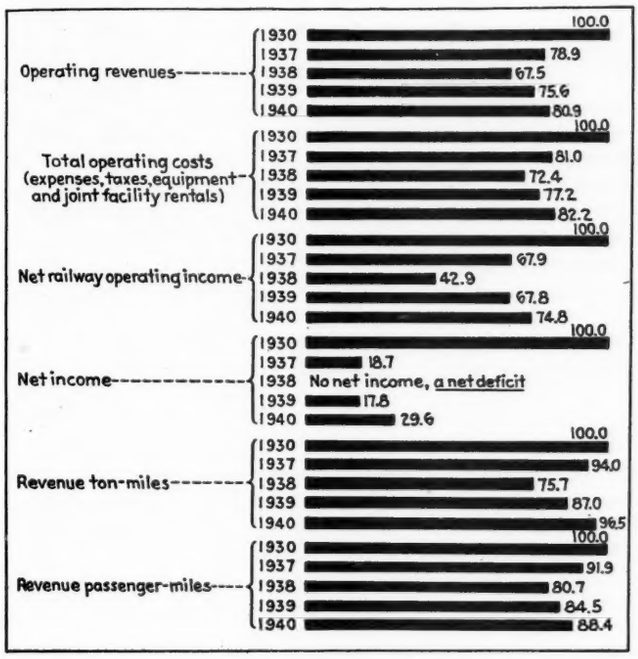


Chart B—Comparative Results for Years 1930, 1937, 1938, 1939 and 1940 (1930 = 100)

Both operating revenues and operating costs were about four-fifths as great in 1940 as in 1930, while net railway operating income was less than three-fourths as great. Net income after fixed charges was less than one-third as great as that of 1930.

Revenue ton-miles almost equalled the 1930 total, falling short by only 3½ per cent, while revenue passenger-miles were slightly more than seven-eights as great as in 1930.

Financial Results

Condensed results of operations of Class I carriers in 1940, shown in the following four tables, Nos. III to VI, are summarized from available monthly reports; the comparative returns for earlier years are based on annual reports.

Table III is a condensed income account for the years 1940, 1939, and 1930. The year 1930 is included in this and succeeding tables, to suppy a more nearly normal basis of comparison than that offered by intervening years since 1930.

Table III—Condensed Income Account

	1940 (millions)	1939 (millions)	1930 (millions)
Total operating revenues	$4,275	$3,995	$5,281
Total operating expenses	3,090	2,918	3,931
Taxes	405	356	349
Net railway operating income	650	589	869
Net income (after fixed charges)	155	93	524

Operating revenues showed an increase of 7.0 per cent in 1940. Corresponding increases in total operating expenses and taxes were 5.9 per cent and 13.9 per cent, respectively. Total operating revenues were greater than in any year from 1931 to 1939, but remained at a level of a billion dollars below that of 1930.

The operating ratio, which stood at 73.0 per cent in 1939, showed a slight decline at 72.3 per cent in 1940.

Net railway operating income increased 10.4 per cent over 1939. It exceeded the total of any year from 1931 to 1939, except 1936, when $667,000,000 was earned.

Net income after fixed charges for the Class I carrier group as a whole was $155,000,000 in 1940. This total compares with a net income of $93,000,000 in 1939. It was greater than in any year from 1931 to 1939, except 1936, when the net was greater than in 1940 by $10,000,000.

A number of companies did not, however, earn their fixed charges, while a few failed to earn their operating expenses and taxes. Preliminary indications are that 16 companies failed to earn their operating expenses and taxes, and suffered a net *operating* deficit; 37 companies failed to earn their fixed charges; the remaining 83 companies earned their fixed charges by varying margins.

The improvement that took place in 1940 was not sufficient to raise the railroads to any substantial degree above the financial position they occupied in 1936 and 1937. That position, in turn, was far below the respective levels of 1930.

Operating Revenues

Operating revenues in all classes of service showed increases in 1940 over 1939, at the same time that all of them ran considerably below those of 1930. Table IV compares the principal items of operating revenue in those three years.

Table IV—Operating Revenues

	1940 (millions)	1939 (millions)	1930 (millions)
Freight revenue	$3,520	$3,251	$4,083
Passenger revenue	415	417	730
Mail revenue	100	99	111
Express revenue	56	55	115
All other	184	173	242
Total	$4,275	$3,995	$5,281

Freight revenue in 1940 increased 8.3 per cent over 1939, while passenger revenue showed a slight decrease.

Express revenue, which represents contract payments to Class I carriers from the Railway Express Agency Inc., was approximately the same in 1940 as in 1939. Gross charges by that agency for express transportation service showed an increase of more than four per cent in 1940.

Chart C shows the monthly trend in railway operating revenues, for each of the four years 1937 to 1940.

Revenues in 1940 ran below those of 1937 from February to July, then exceeded those of 1937 for the next five months. Except for the month of October, when traffic took its upward spurt in 1939, the monthly revenues of 1940 exceeded those of 1939.

Operating Expenses

Table V compares the principal items of operating expense in 1940 with those of 1939 and 1930, showing the emphasis on maintenance in 1940, and on maintenance of equipment in particular.

Table V—Operating Expenses

	1940 (millions)	1939 (millions)	1930 (millions)
Maintenance of way	$500	$467	$706
Maintenance of equipment	817	766	1,019
Traffic	108	106	128
Transportation	1,500	1,418	1,848
General and other	165	161	230
Total	$3,090	$2,918	$3,931

While operating expenses as a whole increased 5.9 per cent in 1940, smaller increases were recorded in traffic, general, and other expenses.

Transportation expenses, which absorb about one-half of the total cost of operation, increased 5.8 per cent.

Maintenance expenditures as a whole increased 6.8 per cent in 1940, compared with an increase of 5.2 per cent in all other operating expenses combined. Much of the increased expenditures in 1940 went into maintenance work, and particularly into maintenance of equipment. Of the increase of $172,000,000 in total operating expenses, $84,000,000 was devoted to maintenance, divided into $33,000,000 for maintenance of way and $51,000,000 for maintenance of equipment.

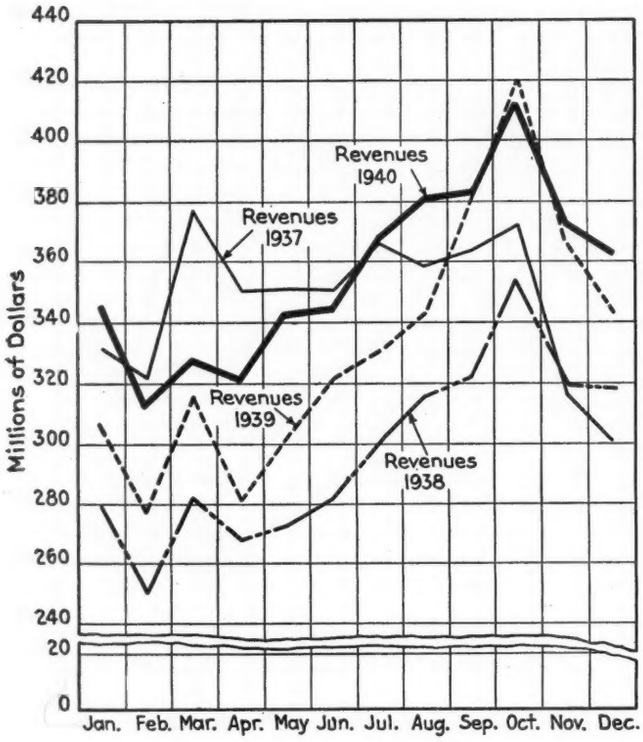


Chart C—Monthly Trend in Railway Revenues 1937, 1938, 1939 and 1940

Net Railway Operating Income and Rate of Return

The rate of return in 1940 averaged 2.49 per cent. This is computed on book investment in railway property used in transportation service, including cash and material and supplies. Table VI shows the net railway operating income and rate of return on property investment for the year 1930, and for each of the nine years 1932 to 1940, inclusive.

Table VI—Net Railway Operating Income and Rate of Return

Year	Net. Ry. Op. Inc. (000)	Rate of Return Per Cent	Year	Net Ry. Op. Inc. (000)	Rate of Return Per Cent
1940	$650,000	2.49	1935	$499,819	1.93
1939	588,829	2.25	1934	462,652	1.78
1938	372,874	1.43	1933	474,296	1.82
1937	590,204	2.27	1932	326,298	1.24
1936	667,347	2.57	1930	868,879	3.28

The rate of return on investment in 1940, 2.49 per cent, compares with 2.25 per cent in 1939. With the exception of 1936, it was the highest return of any year since 1930, although far below anything that can be considered a fair return. The corresponding rates of return for the three districts were as follows: Eastern District, 3.00 per cent in 1940, compared with 2.73 per cent in 1939; Southern Region, 2.40 per cent in 1940, compared with 2.50 per cent in 1939; Western District, 1.95 per cent in 1940, compared with 1.65 per cent in 1939.

Computed on the basis of value (as found by the Interstate Commerce Commission, as of January 1, 1938), the rate of return for Class I carriers as a group in 1940 was 3.27 per cent.

Revenue per Traffic Unit

Average revenue per ton-mile in 1940 amounted to approximately 0.950 cent. This was a reduction of 2.4 per cent under the average of 0.973 cent reported for the year 1939.

While no single factor can be said to account for this decrease, it was due to changes in the composition of commodities transported, especially the fact that the movement of coal, coke, and ore showed larger relative increases than that of manufactured products; also to continuing erosion in unit revenue by reason of efforts to meet competition from other agencies of transportation.

Revenue per passenger-mile averaged 1.750 cents in 1940, compared with 1.839 cents in 1939. The average for 1940, lower by 4.8 per cent than in 1939, was also lower than in any previous year of record.

Certain changes in basic rates per passenger-mile contributed to this decrease, including the decrease in Eastern passenger coach fares that became effective March 24, 1940; also the considerable amount of travel to the two fairs (New York and San Francisco) on special-rate schedules.

Table VII shows the average revenue per ton-mile and the average revenue per passenger-mile for the years 1921, 1925, 1930, and 1935 to 1940.

Table VII—Revenue per Ton-Mile and Passenger-Mile

Year	Revenue per Ton-Mile (cents)	Revenue per Passenger-Mile (cents)
1940	0.950	1.750
1939	0.973	1.839
1938	0.983	1.874
1937	0.935	1.794
1936	0.974	1.838
1935	0.988	1.935
1930	1.063	2.717
1925	1.097	2.938
1921	1.275	3.086

From 1921 to 1940 average revenue per ton-mile showed a decrease of 25.5 per cent, while average revenue per passenger-mile decreased 43.3 per cent. The corresponding reductions from 1930 to 1940 were 10.6 per cent per ton-mile and 35.6 per cent per passenger-mile.

Capital Expenditures and Purchases

Table VIII shows the gross expenditures made by Class I railways for capital improvements, and for the purchase of materials and supplies, for the ten years 1931 to 1940, inclusive. The entries for 1940 are, for the time being, approximations only.

Table VIII—Capital Expenditures and Purchases

Year	Capital Expenditures	Purchases of Material and Supplies
1940 (est.)	$400,000,000	$850,000,000
1939	262,029,000	769,314,000
1938	226,937,000	583,282,000
1937	509,793,000	966,383,000
1936	298,991,000	803,421,000
1935	188,302,000	593,025,000
1934	212,712,000	600,224,000
1933	103,947,000	465,850,000
1932	167,194,000	445,000,000
1931	361,912,000	695,000,000
Total—ten years	$2,731,817,000	$6,771,499,000

Both capital expenditures and purchases of material and supplies increased in 1940 over 1939. The railways were quick to respond to anticipated traffic demands, as foreshadowed by the national defense program.

Capital expenditures for the eight years 1923 to 1930 averaged $842,715,000 per year, while for the ten years 1931 to 1940 they averaged $273,182,000. Purchases of materials and supplies, which averaged $1,383,517,000 per year for the eight-year period 1923 to 1930, averaged $677,150,000 during the ten years 1931 to 1940.

Equipment Installations

Table IX shows statistics as to locomotive and freight car installations, and number of units under construction, each year from 1936 to 1940, and in the year 1930 as well.

Table IX—Equipment Installations
(Railroad owned or controlled units)

	Installed During Year	Under Construction December 31
Steam locomotives:		
1940 (11 months and December 1)	104	116
1939	100	51
1938	164	30
1937	373	131
1936	87	297
1930	782	120
Electric and Diesel Locomotives:		
1940 (11 months and December 1)	263	66
1939	220	66
1938	118	41
1937	77	30
1936	34	7
1930	102	3
Freight cars:		
1940 (11 months and December 1)	59,473	30,684
1939	24,528	37,099
1938	18,517	5,080
1937	75,058	7,947
1936	43,941	25,592
1930	76,909	9,821

Locomotive installations in 1940 were about 20 per cent greater than those in 1939. The number under construction at the close of 1940 was half again as great as in 1939.

Freight car installations in 1940 ran more than twice as high as in 1939, while the number under construction at the close of 1940 was greater than the corresponding figure of any year since 1929, except 1939. A number of large orders for freight car construction were in contemplation at the close of 1940.

While total ownership of both freight cars and locomotives showed slight declines in 1940, the number of units in good order showed an increase. Thus the carriers had a larger serviceable carrying capacity with which to handle their traffic efficiently.

Stored serviceable locomotives averaged 2,997 during 1940 (10 months). The maximum serviceable freight car surplus in 1940 was 190,370 cars, while the minimum was 74,977, exclusive of privately owned or special cars.

Operating Efficiency and Economy

Several records were broken in 1940, with respect to railway operating efficiency and economy, and the year's performance was the best in railway history.

Average speed of freight trains again attained a high level, being 16.7 miles per hour for the first ten months of 1940. The average for the year 1939 was also 16.7 miles and in 1938, 16.6 miles, each of those averages being a previous record. Average freight train speed has increased 5.6 miles per hour since 1922, or more than 50 per cent.

Table X shows the average freight train speed for the years 1922, 1930, and 1935 to 1940.

Maintenance of an average speed of 16.7 miles per hour for 24 continuous hours is the equivalent of 401 miles per day, an increase of 134 miles over the average freight train performance of 1922.

In passenger service, the speed of locomotive-propelled trains during the first ten months of 1940 averaged 37.3 miles per hour, compared with 36.9 miles in 1939; the average speed of rail-motor-car trains was 28.0 miles per hour, compared with 27.8 miles in 1939. The overall average speed of passenger trains of both classes was 35.8 miles per hour in 1940, compared with 35.3 miles in 1939. A speed of 35.8 miles per hour, maintained continuously for 24 hours, is equivalent to 859 miles per day.

Table X—Average Speed of Freight Trains

Year	Miles per Hour
1940 (10 months)	16.7
1939	16.7
1938	16.6
1937	16.1
1936	15.8
1935	16.0
1930	13.8
1922	11.1

Average movement per "active" freight locomotive (excluding stored and unserviceable units from the calculation) during the first ten months of 1940 was 106.7 miles. For the corresponding period of 1939, the average was 104.0 miles.

Corresponding averages for "active" passenger locomotives were 189.7 miles per day in 1940, compared with 184.4 miles in 1939.

Average movement per "active" freight car per day (excluding surplus and unserviceable units from the calculation) was 42.4 miles during the first ten months of 1940, compared with 41.2 miles for the corresponding period of 1939.

Average load per freight train during the first ten months of 1940 was the greatest in railroad history, reaching 850 tons. The corresponding average for 1939 was 807 tons, while the highest average attained prior to 1939 was 804 tons, in 1929.

Ton-miles per freight car-mile (tons per car) increased in 1940 over 1939, the average for 1940 (10 months) being 27.7 tons compared with 26.7 tons in 1939.

Net ton-miles per serviceable freight car day averaged 657 ton-miles during the first ten months of 1940, compared with 601 ton-miles for the corresponding period of 1939.

Gross ton-miles per freight train-hour for the eighth consecutive year exceeded all previous records. The 1940 performance was more than twice as great as in 1921. The average for each of the years 1935 to 1940, and for 1930, are shown in Table XI.

Table XI—Gross Ton-miles per Freight Train-Hour

1940 (10 months)	33,856
1939	32,808
1938	31,141
1937	30,349
1936	29,200
1935	28,674
1930	25,837

Net ton-miles per freight train-hour during the first ten months of 1940 exceeded the previous record established in 1939, the average being 14,060 ton-miles. The average for the corresponding period of 1939 was 13,369 ton-miles, and for 1938 was 12,434 ton-miles.

Economy in use of fuel in freight service equaled the best of all previous records. Freight locomotive fuel consumption per 1,000 gross ton-miles averaged 111 pounds during the first ten months of 1940, compared with 112 pounds for the corresponding period of 1939.

Motive power fuel consumption in passenger service averaged 14.9 pounds per passenger-train car-mile during the first ten months of 1940, compared with 14.7 pounds per passenger-train car-mile in 1939.

Railways employed an average of 1,026,000 persons

during 1940. This was an increase of 3.9 per cent over the year 1939, and an increase of 9.2 per cent over 1938. Railway employment in 1938 reached the lowest level since the turn of the century. The total number of employees aggregated more than a million in each of the last eight months of 1940.

The number of maintenance employees increased approximately 5.2 per cent over 1939, while all other employees increased 3.3 per cent. The increase in maintenance of equipment employees was about 6.8 per cent, and the corresponding increase in maintenance of way employees about 3.2 per cent.

The total payroll in 1940 amounted to approximately $1,950,000,000, compared with $1,863,334,000 in 1939, and $1,746,141,000 in 1938.

Annual earnings of rail employees increased from $1,886 in 1939 to $1,900 in 1940. Average compensation per hour paid for averaged 75.0 cents in 1940, slightly more than the average of 74.9 cents in 1939.

Table XII shows the average number of employees, and their aggregate and average compensation, for each year from 1936 to 1940, and for 1930 as well.

Table XII—Employees and Their Compensation

Year	Average Number of Employees	Total Compensation (000)	Average Compensation per Employee
1940	1,026,000	$1,950,000	$1,900
1939	987,675	1,863,334	1,886
1938	939,171	1,746,141	1,859
1937	1,114,663	1,985,447	1,781
1936	1,065,624	1,848,636	1,735
1930	1,487,839	2,550,789	1,714

The Fair Labor Standards Act of 1938 became operative on October 24, 1938, when a minimum wage of 25 cents per hour was made mandatory on all employers subject to the act. This minimum became 30 cents per hour on October 24, 1939. Railways are subject to the minimum wage, but not the maximum hour, provision of the act.

The third in the series of wage rate minima set by the act raises the minimum to 40 cents per hour on and after October 24, 1945. However, the act provides for a possible intermediate step. The Wage and Hour Administrator may appoint an industry committee to investigate, determine and recommend "the highest minimum wage rates for the industry which it determines, having due regard to economic and competitive conditions, will not substantially curtail employment in the industry."

Such a committee for the railroad industry, known as Industry Committee No. 9, was appointed on November 2, 1939, consisting of 12 members, four each representing employers, employees, and the public. The committee began hearings in February, 1940, and in May recommended a minimum wage of 36 cents per hour for railways of Class I, for electric railways of Class I, and for express and sleeping car companies; for other rail carriers, a minimum of 33 cents per hour. The Wage and Hour Administrator held subsequent hearings for testimony and argument, approved the recommendations of the committee on January 2, 1941, and ordered them into effect as of March 1, 1941.

Certain classes of employees made a demand in 1940 for two weeks of vacation each year, with pay. These classes consisted for the most part of the 14 non-transportation groups, exclusive of train, engine, and yard forces. Negotiations regarding this demand were still under way at the close of the year.

The pay of railway signalmen in Western Territory was increased two cents an hour, an adjustment designed to equalize their rates with corresponding rates in the East and Southeast.

Accident and casualty frequency rates were slightly higher in 1940 than in 1939. However, when compared with 1936 or 1937, years of more nearly equivalent traffic volume, the 1940 record shows a continuation of improving safety conditions in railway operations.

The number of train accidents during the first nine months of 1940 averaged 5.31 per million locomotive-miles, compared with 4.66 in the same months of 1939 and 6.30 in the corresponding period of 1936. Thus, while the frequency rate in 1940 increased over 1939, it was lower than in 1936.

Casualties to employees on duty averaged 7.12 per million man-hours during the first nine months of 1940, an increase of three-tenths of one per cent over 1939, but a reduction of 14.8 per cent compared with 1936.

Two unfortunate passenger train accidents in 1940, both of which resulted from violations of operating rules, marred an otherwise excellent passenger safety performance. The first of these occurred in April and was caused by excessive speed on a sharp curve. The second occurred in July and was caused by failure of the train crew to obey a meet order and by occupancy of a block without authority. These two accidents accounted for all but one of the passenger fatalities in train accidents during the first nine months of 1940.

Highway grade crossing casualties during the first nine months of 1940 numbered 1,252 fatalities and 3,004 nonfatal injuries, or a total of 4,256. This was an increase over the 1939 period, but was less than in 1936.

As the year 1940 drew to a close, the national defense program was the dominating factor in railroad traffic trends. If that program is carried on throughout 1941 as currently outlined, it seems likely that railroad freight traffic will increase over 1940.

Many things, of course, can change this outlook practically over night, such as an abrupt ending of the war in Europe, or our entrance into the war, or other complications. However, the future course of world events is so unpredictable that we can take things only as they are today and project current trends into the future on the basis of a continuation of present conditions.

Projecting the current situation into 1941, it seems reasonable to expect a level of freight traffic in the coming year relatively greater than in 1940. Estimates of this increase vary up to ten per cent. Revenues will be up, although by what percentage is not yet wholly clear. Operating costs will also be up, and the net that emerges will depend entirely on the interplay of inflationary and price-control factors that are now, and will continue to be, operative.

The actual levels of revenues, expenses, and net will be determined by many and shifting political, social, psychological, and international elements, the trend of none of which can be foreseen at this time.

Seldom have the American people awaited the advent of a new year—1941—with greater uncertainty as to the future turn of events. Never have the railways faced a year more uncertain, the full measure or exact character of the potentialities of which cannot now be foreseen. Yet the nation, of which rail owners, managements, and labor comprise an important segment, will play a creditable part in the stirring events of 1941.

The President of the Association of American Railroads, J. J. Pelley, defined the attitude of the railway industry toward the future when he said: "The railroads are ready—now—to do whatever they may be called upon to do. The railroads will keep themselves ready, ahead of any demand which may come. And they will do it under private ownership and operation, and they will meet their obligations firm in the belief that only an America economically strong can continue to be free."

Powerful Locomotives Ordered by Both the Principal Railways Soon After War Began Are Now Standing Them in Good Stead

Photos Courtesy C. N. R.

Canada's Carriers Move War Load

Performance so efficient that unthinking are likely to forget that railways' problem is still unsolved

By Railway Age's Correspondent in Ottawa

THE war has temporarily "solved" Canada's railway problem. The movement by rail of munitions and men in all directions within the country—as well as the tremendous task performed by the carriers in getting military and air and even naval forces to the two seaboards—has brought a large increase in revenue traffic in the last sixteen months and enabled the two principal roads at the end of 1940 to show a remarkably improved financial position. But it is a wartime condition and no adequately informed person pretends after the war—unless Canada enjoys long-range industrial expansion—that this prosperity will continue.

Railways, Except for Equipment, Had Large Reserve Capacity

Both the Canadian Pacific and the Canadian National during the past year have many times received high praise for the extent and the efficiency of their war contribution. An extraordinary demand was placed upon both roads beginning in the fall of 1939; and they at that time were in a favorable position to meet it, for they were only beginning to emerge from the corrosive effects of a ten-year depression. They had ample capacity and needed only some additions to rolling stock and motive power, and a stepping up in maintenance, to enable them to handle a largely-increased traffic. Additional motive power and rolling stock were immediately ordered, with the aid of Dominion financing, not only to meet the carriers' estimated requirements for more than a year ahead—but also so that manufacturers could get the railways' requirements completed speedily, and turn their productive capacity to other defense products.

Munitions and Air Training Program

The efficiency of the railways' organization and personnel had not been impaired by the long depression. In the face of depleted equipment and, in some instances, down-at-heels trackage—together with the inevitable dislocation of administrative personnel through enlistment in the fighting forces—the two railways went earnestly to work sixteen months ago. They labored through trying winter conditions in 1939 and did a herculean job this past summer in extending trackage and organizing an even more effective equipment distribution.

The Dominion's billion-dollar munitions program now in full swing—involving a vast amount of two-way haulage and provision of emergency trackage—has been one of the challenges to the energy and resourcefulness of the two principal railways. Another has been the movement of men and plane parts for the Commonwealth air training plan, which has about forty training centers across the country. Then, there is the movement of wheat, flour and other foodstuffs both within the country and to the seaboard. All this special service—additional to the normal functions of two transcontinental roads—is being given and with an amazing absence of delay or dislocation.

To meet the sudden need for lumber with which to build the thousands of hutments in Eastern Canada for

the military and air forces this winter, both roads had to undertake an emergency movement of building material, chiefly from British Columbia. The Canadian Pacific and Canadian National had to quickly augment their flat car equipment for this job, and also to carry airplane sections. New equipment was obtained, but the job also entailed the efficient utilization of that on hand already.

"Public welfare and war-time exigencies make it obligatory that details of the railways' effort shall not be published abroad," President Sir Edward Beatty of the C. P. R. observes in his year-end statement, "with the result that its extent is perhaps not fully understood, but it is significant that at a time when the country is well into a hitherto unequalled industrial development, we hear no word of criticism of the way in which its major transportation agency is carrying on this increasing task.

Did Adversity Give Rise to Improved Railroading?

"This satisfactory situation has not been brought about by reason of vastly extended railway lines or by greatly increased equipment. Higher standards of efficiency in all departments of railroading are responsible. Cars are carrying heavier and better-packed loads, and engines of increased power are hauling more of them at a time. Road-bed and terminal facilities have been improved and railroad workers are handling their various jobs with a higher degree of intelligence and a consequent greater efficiency than ever before. It may be that some years of adversity resulting from the depression have tended to enforce this increased efficiency upon us, but in any case the result has been highly salutary and we have arrived at this time of another great war thoroughly competent to meet every demand that may be expected.

"As the country's war effort progresses the demands on the main transportation system will become more exacting. There has been a notable decrease in unemployment, and a steady expansion of purchasing power—especially among the workers. To some extent, this has already increased the turnover of ordinary business. We are warned, however, that, as the demand for more and more war material becomes increasingly urgent, normal living standards and normal purchases will have to make way, and the labor and materials which would be used in them will have to be turned into the war effort.

Shortage of Some Goods Will Help Readjustment at War's End

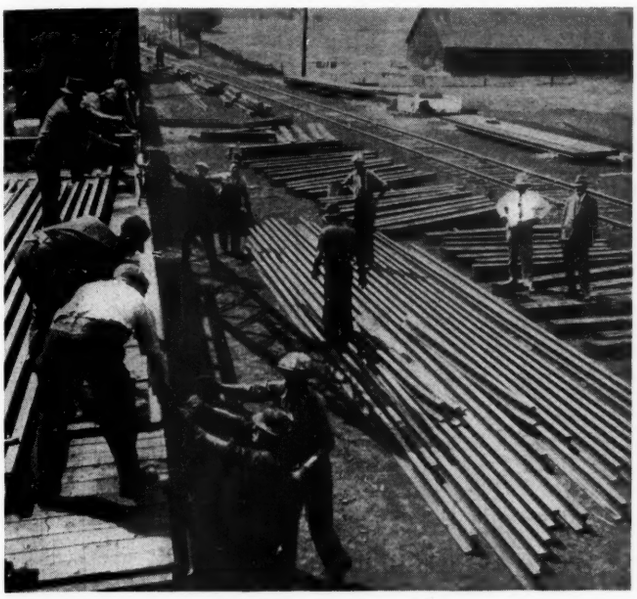
"Already our government has wisely sounded a warning in this direction in calling upon us to reduce expenditures for certain luxuries. This movement doubtless will have to go much further, but, since it will represent only a change in the flow of purchasing power from one channel into another, it will not adversely affect the general industrial situation. As well as being imperative, it may prove highly advantageous if, when the war is over, a shortage of such commodities provides employment for those who, in the meanwhile, have been producing war materials.

"The great expansion in national economic activities is not without its difficulties, and of these the most important is the freezing of buying power in the West as a result of the wheat blockade. Much of our national economic machinery depends for its successful functioning on the exchange of Western wheat for other goods and services, and it is earnestly to be hoped that the termination of a stimulation of other industries by war will be accompanied by conditions which will permit the ready marketing of our store of wheat.

"The widespread acceleration of industrial activity will be reflected in increased railway earnings for the year. In the case of the Canadian Pacific, this increase will be gratifying, but will fall considerably short of the figures which in pre-depression years permitted railway operation on a sound economic basis, and gave shareholders a reasonable return on their investment. With the natural increases in all classes of traffic, the war has brought to this company other opportunities of serving in the national cause, and these have been accepted with enthusiasm and are being carried forward as swiftly as conditions will permit. Our steamships on both Atlantic and Pacific oceans are on war time duty under Admiralty

C. N. R. Crane Unloading Airplane Parts at a Canadian Seaport—The Initials on One of the Gondolas Indicate That U. S. Rolling Stock Is Doing Its Bit in the Service of Its Good Neighbor's War Effort

direction, and many of them are in actual naval service. Wherever called upon, their officers and men have acquitted themselves with that bravery and devotion to duty that is the accepted standard of the British Merchant



Sidings Have Been Lengthened and Double-Track Mileage Increased to Facilitate Train Movement, Especially Near Seaports

Marine, and that even to the point of the ultimate sacrifice. Our losses so far include the 'Empress of Britain,' the 'Beaverburn' and the 'Beaverford.'

Railway Shops Produce Munitions

"As in the previous war, some of our railway shops have been turned or are being turned over to war work and undoubtedly will make a considerable contribution to the nation's productive effort. Many of our officers with special abilities in engineering and other branches of our work have been loaned to the British or the Canadian governments, and almost daily there arise problems in the solution of which one or other of our departments is able to give advice or practical assistance. So far about 2,400 of our employees have joined the fighting forces, and this figure is likely to be considerably increased as time goes on.

"We are far from the full flood tide of our war production, and as we approach nearer to it we are likely to face far-reaching readjustments in methods of industrial operation, and even changes in methods of living. These will come gradually in most cases, and though they may involve inconveniences approaching hardship, they undoubtedly will be accepted cheerfully, as being the lighter part of the sacrifice that duty to humanity is placing before us all. It would be unwise to forget that, added to the burdens of public debt which already exist, these war expenditures will create a situation in which the economic outlook for the nation will depend, to no small extent, on the capacity and skill exhibited by our public authorities in pruning unnecessary expenditures to the very limit. It is to be hoped that we shall see definite attempts to reduce all those public expenditures which are not directly needed for the prosecution of the war, and that we shall enter on the post-war period with a chastened outlook in this matter of public spending.

"Even today the urgent call is for saving—saving for war purposes. The government again will have to call upon us for money, and more money, and we shall have to lend to the war effort to the utmost of our ability. We hear much talk of the social changes that are to follow upon the end of the war. I venture to suggest that the economic changes then experienced will prove more imperative and more immediately effective than any other.

"It is altogether probable that we shall move into a world that is much poorer than it has been over many generations. For some time to come the countries to which Canada sells products of farm, mine, forest and factory may not be able to pay high prices for their purchases, and it may easily be that our methods of production will have to be raised to new standards of economic efficiency."

Large Increases in Operating Net

The year 1940 will show a net operating income for the Canadian Pacific of about $20,000,000, which is twice the amount for 1939. At the end of November, gross revenues of the C. P. R. were over 12 per cent ahead of the first eleven months in 1939. The estimated results for the C. N. R.—in comparison with 1939 and 1938—are given in a statement made public by President Hungerford as follows:

	1940	1939	1938
Operating Revenues	$244,000,000	$203,820,186	$182,241,723
Operating Expenses	202,000,000	182,965,768	176,175,313
Net Operating Revenue..	$ 42,000,000	$ 20,854,418	$ 6,066,410
Operating Ratio	83.78%	89.76%	96.67%

"The safe and expeditious handling of special wartime movements of thousands of men of the navy, army

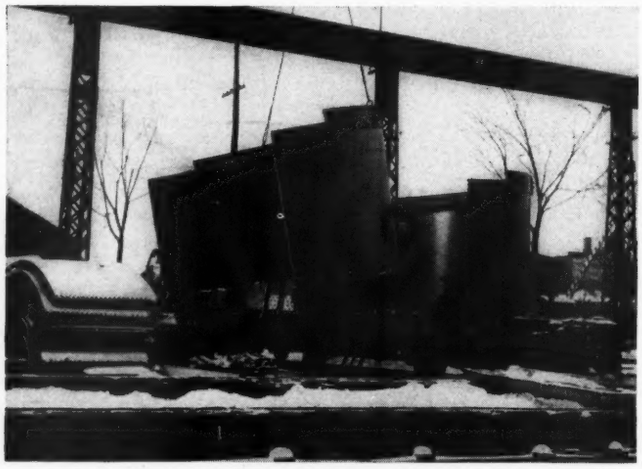
Counter Cars Have Been Provided to Serve Meals to Soldiers on Troop Trains

and air forces," Mr. Hungerford's statement continued, "has been the concern of all departments of the Canadian National—railways, sleeping and dining car, steamships, air lines, hotels, express and telegraphs.

"Meeting the increased demand for railway transportation service has meant the expansion of rolling stock and other facilities. The Canadian National early took steps to ensure that its supply of cars and locomotives would be adequate. Its shop programs on repair and rehabilitation have brought the number of units available for service up to a high percentage figure. During 1940, 2,760 new box cars, 500 flat cars, 100 refrigerator cars,

30 mail, express and baggage cars, 150 ballast cars, and 25 heavy duty steam locomotives were added to the equipment of the railway.

"Increased traffic due to war conditions has made necessary certain additions to track facilities by way of passing tracks, sidings and yards. Further additions to



Loading Steel Plates at a Fabricating Plant for Shipment to a New Munitions Structure

physical facilities are under study and consideration to meet growing wartime demands for railway transportation service. 1940 has also seen the expansion of Canada's national air service, the Trans-Canada Air Lines [operated by the C. N. R.], spanning the Dominion and forming an important link in Empire communications. Additional passenger, air mail and express service was provided between Montreal, Toronto and Vancouver, making two flights daily in each direction. There were also inaugurated services between Toronto, London and Windsor, and between Montreal and Moncton, the latter connecting with planes to Prince Edward Island and to the Atlantic ports of Halifax and Saint John. Over a total route mileage of nearly 4,000 miles the T. C. A. planes are now flying 15,000 miles every day. Further extensions are planned to speed up the commerce of the country.

Protecting Seniority of Men in Service

"At sea the vessels of the Canadian National Steamships (West Indies) Ltd. and of the Canadian Government Merchant Marine Ltd., are doing important work in the import and export activity of the Dominion and in passenger carrying. The vessels now operated by the C. G. M. M. include some steamships formerly managed by French and Danish interests. Engaged in the naval defense of the Dominion are the 'Prince Robert,' the 'Prince David,' and the 'Prince Henry,' formerly of the Canadian National Pacific Coast Steamship fleet. Some 1700 employees of the Canadian National System are on active service with the Navy, Army and Air forces of Canada.

"The preservation of seniority and continuity of service on the railway for these employees has been the subject of action of the board of directors."

Railway Problem Just Eased—Not Solved

At the beginning of 1940 the officers of the Canadian National estimated a cash deficit for the year of about $15,000,000, which was $25,000,000 less than the actual cash deficit for the previous year, but in subsequent months it was evident that the large increase in revenue traffic was going to whittle this deficit down to a very small amount. The tragedy of the situation is, however, that—with the glaring fact that war conditions are rubbing the red from the Canadian National books, as well as greatly improving the C. P. R. position—taxpayers in the Dominion find it hard to realize that after the war the railway problem will still exist. They find in the excellent war service rendered by both railways just one more reason for assuming that conditions are not so bad with the railways—and that, after all, it is not necessary to treat them as other private enterprise is treated.

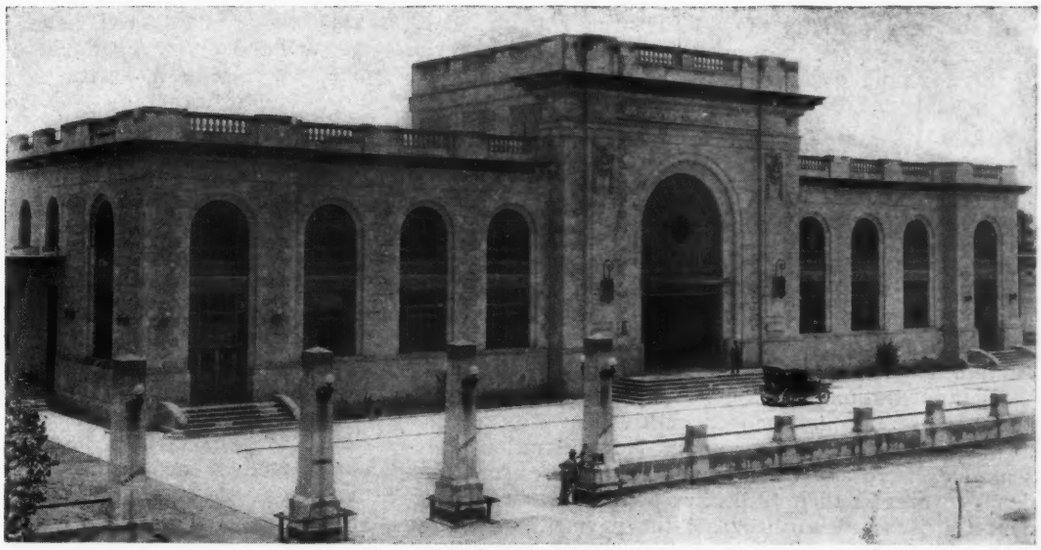
It is worth recalling that of the fifteen years 1923-37, the Canadian National met all its charges and had a little to spare in only two years (1926 and 1928). These were both described as boom years. And even in these years the aggregate of surplus over all charges, operating and interest (on obligations in the hands of the public) was only slightly over $5,000,000. In the other years there were substantial deficits after charges running from a low of about $4,500,000 in 1927 to the highs of nearly $61,000,000 in the years 1931 and 1932, the first two and the worst years of the depression. The cash deficit has steadily dropped since that time to about $25,000,000 in 1939, while for 1940 it may almost disappear again.

Continued Rise in Traffic

Revenue car loadings for 1940, as they have in all previous years, furnished an accurate picture of the country's industrial trends. Cumulative figures up to December 14 showed an expected drop in grain products from about 400,000 cars to 370,000. Destruction of European markets for Canadian wheat and the ocean transportation difficulties created by the U-boat were bound seriously to reduce grain movement. There was a large increase in lumber carriage, from 98,000 cars to 142,000 cars, much of this to meet military needs. It was also to be expected that there would be a large increase in ore movement, for war purposes, the rise being from 152,000 cars to 172,000. L.c.l. loadings rose slightly to 660,000 cars, while miscellaneous increased, also attributable to war needs largely, from 570,000 to 670,000 cars. While the percentage increase for the entire year in total loadings over 1939 will not be much more than 10 per cent, the accelerated rise in the past three months indicates that the cumulative effect of the huge munitions program will be quickly passed on to railway revenue in the coming months.

Much of the additional trackage which has been provided is in New Brunswick and Nova Scotia, the latter province being the bottleneck of a large amount of the war movement by rail. Munitions Minister C. D. Howe (then Transport Minister, and who recently learned what it means to be cast onto the wintry Atlantic in a small boat when his steamer has been torpedoed) insisted in the House of Commons at Ottawa a few months ago, in defending the project to complete the new C. N. terminal in Montreal, that this work was part of the war program—to see that men and munitions, as well as ordinary commerce, could be moved without interruption to and from the Maritime provinces.

HIGHWAY PATRIOTISM?—The various groups in Washington, interested in securing large federal appropriations for their particular hobbies, have shown no disposition to moderate their demands—to enable the government to concentrate its expenditures on the defense effort. According to an Associated Press dispatch on December 30, "highway construction advocates have gone ahead with plans calling for little if any reduction."



The Station and Office Building of the National Railways of Mexico at Durango, Dgo.

A Year of Change for Mexican Railways

Important shake-up in officers, policies and organization marked operation by the Workers' Administration in 1940

By Our Mexican Correspondent

DURING 1940, the second full year of operation of the Mexican National Railways by the Workers' Administration, net earnings decreased 13 per cent in spite of the fact that gross operating revenues increased to the highest peak in the history of the National lines. The year was one of many changes. The Board of the Workers' Administration was reorganized twice, with many subsequent changes among department heads and other officers, and the newly-installed government is now insisting on a further complete reorganization that will effect substantial economies in operation and bring the properties out of the maze of financial difficulties into which they have been sinking deeper and deeper since they were turned over to the workers. The final plan of reorganization has not yet been agreed upon, but the government has implied that an economical, efficient administration must be set up or the workers' management may be abolished and the property taken back by the government.*

The first reorganization of the Board of the Workers' Administration occurred in March, 1940, following a number of serious train wrecks and minor accidents, the most serious of which were attributed to a wrong interpretation of orders. These accidents resulted in such unfavorable publicity that President Cardenas summoned Union and Administration representatives to determine the cause and put an end to such accidents, requesting at the same time that the Union demand the resignation of the Board of the Workers' Administration. Accordingly, the entire Board resigned on March 11, and was reorganized on the following day. A number of officers were relieved from service on the grounds of serious administration errors.

Government Asks for Reorganization

During the course of the year, the 5.64 per cent tax on gross revenues that was to be paid to the government

A View of the Yard at Tampico, Tam., One of the Principal Terminals of the National Railways

* Since this article was written, press reports indicate that the Chamber of Deputies of the Mexican National Legislature unanimously approved a bill removing the Railroad Workers Syndicate from control of the National Railways. This bill has yet to pass the Senate.

had not been paid up to and including August, 1940. Earlier in the year, the government demanded payment of this tax, amounting to about $50,000 per month, beginning with September. Previously, the tax has been offset by recognition on the part of the government of 50 per cent of the liabilities of the former administration, as provided by the law, but the demand of the government was based on the claim that the Workers' Administration should also recognize and accept 50 per cent of the outstanding bills collectible from past administrations of the National lines, although this was not specified in the law.

This attitude of the government placed the Workers' Administration in a critical financial situation and forced the administration to withhold payment of certain national and foreign indebtedness. Protests were presented to the government and Union and Administration representatives were again summoned before President Cardenas to present their respective points of view. President Cardenas then ruled that the payment of foreign debts should be renewed immediately, and that a complete reorganization of the lines was absolutely necessary.

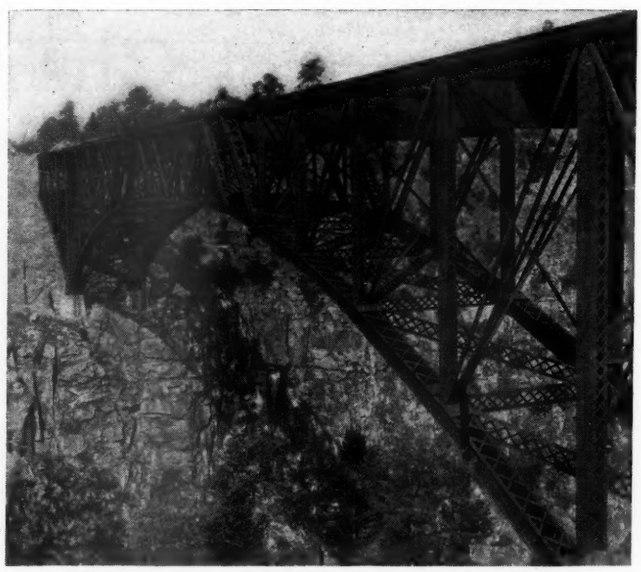
The Board, upon the request of the government, had already developed a reorganization plan which proposed, among other things, that salaries be reduced to the basis of May 1, 1938, when the Workers' Administration was created; that unnecessary jobs be eliminated; that overtime payments be restricted; that persons be compelled to take their vacations instead of receiving the equivalent in cash; that trains be operated with full tonnage; and that a rigid disciplinary regime be re-established by granting department heads authority to apply discipline.

Although this reorganization plan had the apparent approval of the government, the Union did not approve of it and the entire Board resigned. A Union convention was then called to study the financial and general situation of the roads, and the Workers' Board was again reorganized. The Union then submitted its own plan for reorganization, which called for (1) The Workers' Administration to function independently of Union influence, the Union to intervene only in the case of serious conflicts; (2) reorganization of railroad services, through which economies of $8,360,000 should be obtained yearly without affecting salaries or personnel; and (3) revision of the law of April 23, 1938, which created the Workers' Administration, revising the percentages of the gross revenues to be invested in additions and betterments and the amounts due the government as taxes.

Several conferences with government representatives followed, and in October the government rejected the plan presented by the labor representatives because the proposed economies would not meet the immediate financial needs of the railroads. A counter plan was presented by the government, which then took the position that if it was not accepted, the roads would be taken over. The government's plan provided for (1) The readjustment of salaries and personnel to those in effect on May 1, 1938; (2) the government to release the 5.64 per cent tax, with the understanding that it would be applied to the purchase of new equipment; and (3) the establishment of advisory and technical committees, to increase operating efficiency, to revise labor contracts, to study the system of tariffs and insure equitable rates, to coordinate government policies as regards highway competition and to study all administration problems.

It was further stated that if the Workers' Administration established a sound financial basis, the government would be in position to obtain ample foreign credit and develop a vast rehabilitation program for the roads. Several interviews followed, aiming at a final understanding, and the Union finally agreed to formulate another plan, whereby more drastic savings would be obtained. New administration methods were then introduced to meet in part the increasing financial obligations occasioned by the government's demands for payment of the 5.64 per cent tax.

A temporary plan was finally developed by the Union, which called for economies of $2,345,000 per month to be effected during November and December, 1940, including non-professional illness, $50,000; suppression of the Mixed Committee of Appelations, $5,000; reduction in overtime pay, $40,000; reduction in Per Diem, $150,000; reduction of road employees expenses, $10,000; materials, $1,200,000; crossties, $400,000; vacation time, $250,000; and a 3 per cent reduction in salaries, $240,000. The saving of $400,000 for crossties was to be obtained by suspension of purchases during the two months, as the stocks on hand were sufficient to meet a year's needs. The $1,200,000 for materials was to be deducted from operating expenses during November and December only, as the necessary materials will be purchased through a loan that the government is arranging with American firms, to be repaid later on.



A Three-Span Cantilever Bridge Over the Chico River on the National Lines

No action has been taken by the government as regards this last plan, and the problem faces President Manuel Avila Camacho, who is reported as in favor of abolishing the Workers' management and placing the management in the control of a government board in which the Union will be given representation.

Operating Results

During 1940, gross operating revenues continued their upward trend, reaching the highest peak in the history of the National lines. These revenues amounted to $109,217,969 in the first eight months of 1940, as compared to $104,069,344 in the same period of 1939; freight earnings were $76,387,861 in 1940 as against $72,790,061 in 1939; passenger revenues increased from $19,144,506 in 1939 to $20,641,110 in 1940, and express earnings increased from $8,668,798 to $9,044,484; while miscellaneous revenues decreased from $3,465,977 to $3,144,513.

Operating expenses were $92,787,218 in the first eight

months of 1940, while in 1939 they were $85,187,621. Expenses increased in all departments except for a small decrease in miscellaneous expenses and a decrease in credits for freight on material for capital improvements. Although the increase in net revenue ton-kilometers called for additional expenses, the latter increased at a higher ratio, 8.92 per cent, than the increase in earnings, 4.95 per cent. As a consequence, net earnings decreased from $18,881,772 in the first eight months of 1939, to $16,430,750 in that part of 1940, a reduction of 13 per cent. Such results brought about an increase in the operating ratio from 81.86 per cent in 1939 to 84.96 per cent in 1940. Many factors were responsible, but the principal ones were the lack of a budget and expense control system, and higher wages and materials costs.

Selected operating statistics for the first 10 months of 1940, compared with 1939, are shown in the accompanying table.

Freight Transported by Group Classification

(First 6 Months 1939-1940)

	Tons		Revenues		Ton-kilometers		Revenue per ton-kilometer (cents)	
	1940	1939	1940	1939	1940	1939	1940	1939
Forest products	301,997	334,487	3,352,286	3,482,101	122,242,904	133,854,006	2.661	2.601
Agricultural products	1,350,854	1,572,790	16,055,389	16,267,006	661,071,698	643,144,770	2,429	2,529
Animals and animal products	118,734	123,458	1,847,151	1,866,669	59,207,967	65,980,160	3.120	2.829
Inorganic products	2,248,810	2,076,016	19,835,818	17,426,903	1,077,046,921	988,192,374	1.842	1.764
General mechandise	412,766	369,119	8,004,064	7,089,516	286,042,034	244,338,127	2.798	2.902
Grand Total	4,433,161	4,475,870	48,994.707	46,132,195	2,205,611,524	2,075,509,431	2.214	2.233
Per Cent Increase	0.95*		6.21		6.27			

* Decrease

Comparative Operating Statistics

First 10 months 1939-1940

	1940	1939	Per Cent Increase	Per Cent Decrease
Locomotive kilometers	36,497,752	36,211,921	0.8	
Freight train kilometers	14,818,763	14,660,558	1.1	
Passenger train kilometers	10,682,707	10,629,216	0.5	
Mixed and special kilometers	3,450,514	3,409,076	1.2	
Non-revenue kilometers	78,387	91,282		16.5
Total train kilometers	29,030,371	28,790,132	0.8	
Passenger car kilometers	83,488,518	87,198,152		4.3
Freight loaded kilometers	203,621,849	201,203,388	1.2	
Freight empty kilometers	98,082,511	97,531,000	0.6	
Freight total kilometers	301,703,360	298,734,388	1.0	
Net-ton-kilometers	5,203,612,000	5,014,827,000	3.8	
Gross ton kilometers	12,239,585,000	11,908,645,000	2.8	
Total number of cars loaded	431,033	444,144		3.0
Net tons per train kilometer	335	325	3.1	
Gross tons per train kilometer	748	733	2.1	
Average train speed (k. p. h.)	22.6	23.3		3.0
Gross-ton-kilometers per train hour	16,889	17,095		1.2
Utilization of tractive power (per cent)	73.3	74.5		1.6
Kilometers per locomotive day (freight)	188	187	0.5	
Per cent loaded car kilometers to total	67.5	67.4	0.1	
Kilometers per car per day	55.1	57.6		4.3
Net tons per car	25.56	24.92	0.6	
Cars on line daily	16,006	15,332	4.4	
Kilometers of line operated	13,281	13,281		

Labor and Material Costs

A further increase in the wages of low-salaried shopmen and continued increases in material costs, particularly because of the high prevailing rate of exchange, are reflected in the following data on mechanical repairs. For the 12 months ending with October, labor costs for repairs to coaches increased from $20.05 to $23.51 per 1,000 kilometers run, or 17.3 per cent, and materials increased from $16.34 to $16.75 or 2.5 per cent, the total increase being from $36.39 to $40.26 or 10.6 per cent. Labor costs of freight car repairs increased from $15.07 to $16.80, or 11.5 per cent, and materials increased from $16.81 to $18.08 or 7.6 per cent. Locomotive repairs increased 8.3 per cent, or from $184.67 to $200.05, per 1,000 kilometers run, for labor, and from $122.47 to $130.65 or 6.7 per cent, for materials, while the total cost rose from $307.14 to $330.70, or 7.7 per cent. There has been a marked lack of materials in the storehouses for shop repairs.

Freight Traffic Trends

The number of revenue cars loaded, excluding government shipments and materials for other railroads, during the first six months of 1940 were 4,433,161 as compared with 4,475,870 in the same period of 1939. This reflects a decrease of 42,709, or 0.95 per cent; however, net-ton-kilometers rose from 2,075,509,431 to 2,205,611,524, an increase of 130,102,093 or 6.27 per cent, as a consequence of longer average hauls, which brought about an increase from $46,132,195 to $48,994,707, or 6.21 per cent, in carload freight revenues. The average receipts per ton-kilometer, however, decreasd from 2.223 cents to 2.214 cents because of the longer distance per average haul, and the larger proportion of tonnage of lower classification merchandise, as may be seen in the accompanying table.

Additions and Betterments

From May to December, 1938, the first eight months of the Workers' Administration, $7,949,060 was invested in additions and betterments, an excess of $2,708,118 over the 5.36 per cent of the gross earnings ($97,592,214) specified by the law. In 1939, additions and betterment expenditures were increased to $18,801,329 or $10,325,650 more than that required by the law. Of this total, $9,530,104 was invested in rails, maintenance of way structures and in the reconstruction of rolling stock, and $9,271,225 was paid on equipment bought by the previous administration. In the first six months of 1940, however, investments in additions and betterments were reduced to $5,484,620 as compared with $9,448,713 in the same period in 1939, which amount represents 6.60 per cent of the gross earnings for that period.

Construction

The Department of Communications and Public Works has prosecuted a number of construction projects during the year as follows:

Ixcaquixtla, Pue., to Chacahua.—A section 73 kilome-

ters long from Ixcaquixtla to Petlalcingo, Pue., is now in operation. The total amount invested to date is $6,852,726.

Calzonzin-Zihuatanejo line.—126.6 kilometers has been located, 125.5 kilometers of grading has been completed, and the track has been laid for 88.5 kilometers, at a total cost of $20,330,002, including maintenance and the purchase of machinery and rolling stock now in service.

Puerto Mexico, Vera Cruz to Campeche.—This line has been located for 738.7 kilometers; 454.6 kilometers of grading has been finished, and 292.7 kilometers of track has been laid, at a total cost of $43,742,012.

Fuentes-Brotantes to Punta Penasco.—A line, which is intended to connect with Santa Ana, Son., on the Southern Pacific of Mexico, has been located and grading completed on 173.8 kilometers, while 131 kilometers of track has been laid, at a total cost of $8,328,260.

Acapulco to Zihuantanejo, and Corondiro to Zihuantanejo.—A section of 383.8 kilometers has been located.

All these roads are being constructed by the government in an effort to extend the railroad network in the country. A total of 1,542.4 kilometers has been located and 828.1 kilometers of earthwork has been finished, with 585.2 kilometers of track laid at a total cost of $79,893,566.

Employees and Their Compensation

The average number of employees per month during 1937 was 44,295, and they received a total of $81,885,057 as salaries and other compensation, an average of $1,849 per year per employee. In the year 1938, the average number of employees declined to 44,110, but total salaries and compensation increased to $84,633,275, a yearly average of $1,919. In 1939, the average number of employees decreased to 43,483, while salaries and compensations rose to $89,483,280, a yearly average of $2,058 and a monthy average of $171.48. The average number of employees in the first five months of 1940 increased to 44,211 and their salaries and compensation averaged $193.99 per month.

The increases are mainly due to increased salaries of men in the lower wage brackets, particularly in the mechanical department, where an agreement was reached that each man should be promoted to the job immediately above, which practically abolished second class mechanics and second class helpers. The normal increase in the number of pensioned men also affects this item.

Although a high rate of exchange still prevails, imports to Mexico through the four international gateways with the United States show an increase of 605 cars, while exports increased by 674 cars. The European war has reduced sea imports 385 cars, while a further and much more serious reduction has been experienced in exports, which were reduced by 5,865 cars, as shown in the accompanying table.

Loaded Cars Interchanged

(10 months 1939-1940)

	Imports		Exports	
	1940	1939	1940	1939
Laredo	5,882	5,618	5,927	6,139
El Paso	2,269	1,959	5,319	4,702
Eagle Pass	1,236	1,112	647	905
Brownsville	190	283	1,533	1,006
Totals	9,577	8,972	13,426	12,752
Water Ports				
Tampico	1,998	2,073	3,556	7,983
Veracruz	1,283	1,786	3,688	5,109
Manzanillo	1,623	1,430	....	17
Totals	4,904	5,289	7,244	13,109

Construction and Maintenance Must Increase to Keep Pace

(*Continued from page 25*)

$7,250,000. These latter figures, based upon data secured from practically all of the railways of the country, represent the largest purchases by the railways for maintenance of way and structures work equipment in any one year, and show conclusively the extent to which they are turning to such equipment to make possible the higher standards of maintenance demanded today in the face of the constantly increasing demands for greater efficiency and economy.

In view of the favorable prospects for railway traffic and earnings in the year ahead, the trend toward larger purchases of equipment in 1941 will unquestionably continue. This will be brought about by the needs of many roads for replacing worn-out and obsolete units of equipment, and for supplementing their present equipment in the light of the larger work programs in prospect, and by the entering of the equipment market for the first time on a sizable scale of a number of roads which, as the result of changed wage scales and increased demands for quality work with the greatest economy, have found that they must now more fully mechanize their forces.

* * * *

660-Hp. Diesel-Electric Switcher Built for the Southern By the American Locomotive Company—It Has General Electric Electrical Equipment

Little Light in Financial Gloom

Activity in equipments and no new bankruptcies afford some welcome relief in otherwise persistent dulness

By J. G. Lyne and W. H. Schmidt

Assistant to Editor Associate Editor

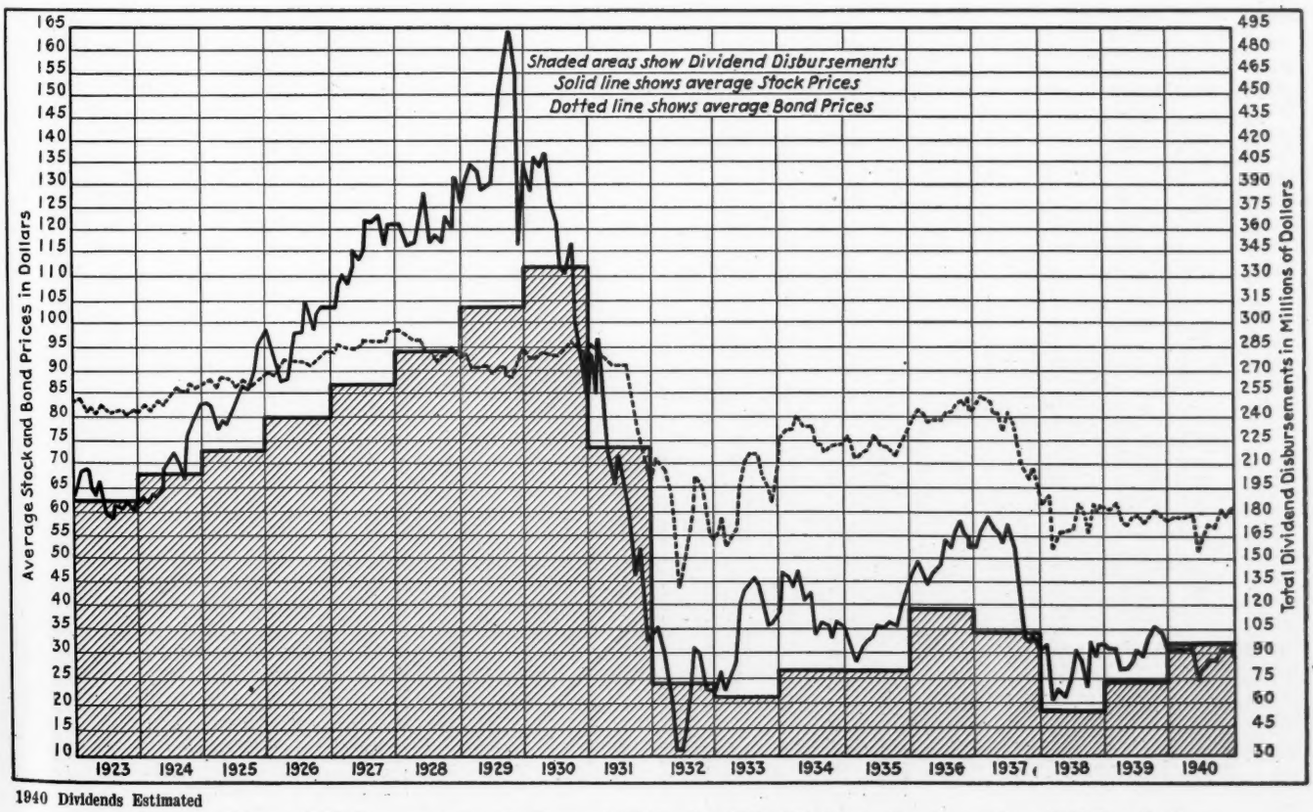
THERE was in 1940 no basic change in the fundamentally unsatisfactory financial condition of the railways, which has now existed so long that it must be recognized as chronic. The movement of market prices of both stocks and bonds was largely "sidewise" throughout the year, with bond prices slightly higher and stock prices slightly lower at the end of the year than at its beginning. These changes are set forth graphically in accompanying charts. That stock prices should have behaved in this fashion, despite a rather pronounced improvement in railroad traffic and earnings, merely reflects the recognition by the investing public that nothing substantial has yet been done to assure that owners will be allowed to retain for long any considerable proportion of the rewards ordinarily associated, in times past, with ownership of a private business enterprise.

That is to say, there has been no let-up in the demands —both by businessmen and admitted socialists—that government funds continue to be "invested" (at the expense of *general* taxpayers) in socialized transportation facilities (waterways and "super"-highways). There has as yet been no acknowledgment by the railway labor organizations that a "wage" must be allowed to capital, at least sufficient to attract enough investment to enable the railways to keep their services abreast of their competition—if the carriers' employing power is not to dwindle.

Investors Are Wary

Railroad earnings, to be sure, did rise in 1940 and, temporarily, the crisis of the carriers has been relieved—but the investing community (to judge from the market price of railway securities) is fully aware that the erosion of traffic by rival agencies is continuing; and that present earnings, modest though they be, are no criterion of what the "wage" of the railway investor is likely to be in the years that lie ahead.

Under such circumstances the railroads, for still another year, were not actively in the market for new capital (rounding out a decade of sub-normal new investment). The absence of new financing, of course, did not hold in the case of equipment. A considerable vol-



1940 Dividends Estimated

Average Prices of 20 Representative Stocks and 20 Bonds With Dividends Shown on Same Relative Scale

Principal Equipment Trust Issues Sold in 1940

Road	Maturity	Amount	Int. Rate %	Sold to Banker: Price	Sold to Banker: Cost	No. Bids Submitted	Purchaser
Atchison, Topeka & Santa Fe, Ser. D	1941-50	$10,000,000	1¼	100.544	1.15	5	Harriman Ripley & Co., et al.
Atlantic Coast Line, Ser. G	1941-50	8,150,000	2	100.3267	1.94	6	Drexel & Co., et al.
Baltimore & Ohio, Ser. J	1941-50	4,750,000	2½	103.0391	1.893	5	Harriman Ripley & Co., et al.
Baltimore & Ohio, Ser. K	1941-50	4,750,000	1⅝	100.155	1.595	6	First Boston Corporation, et al.
Bessemer & Lake Erie	1941-50	4,000,000	1	99.216	1.15	7	Salomon Bros. & Hutzler, et al.
Chesapeake & Ohio	1941-50	2,500,000	1¾	101.777	1.41	10	Blyth & Co.
Chicago, Milwaukee, St. Paul & Pacific[1]	1941-44	5,000,000	1¾	Par	Par	..	Salomon Bros. & Hutzler
Chicago, Rock Island & Pacific[2]	.....	4,500,000	2½	.....	....	..	.....
Chicago, Rock Island & Pacific, Ser. IQ[3]	1940-47	20,400,000	2½	100.815	2.28	3	Salomon Bros. & Hutzler
Chicago, Rock Island & Pacific, Ser. T	1941-50	2,460,000	2	100.179	1.99	2	Salomon Bros. & Hutzler, et al.
Chicago, Rock Island & Pacific, Ser. U[4]	1941-47	2,758,000	2	101.802	1.49	2	Halsey Stuart & Co.
Delaware, Lackawanna & Western, Ser. C	1940-50	3,100,000	2½	Par	Par	..	Reconstruction Finance Corporation
Denver & Rio Grande Western, Ser. F	1941-50	1,260,000	2	100.277	1.95	3	Blyth & Co.
Duluth, Missabe & Iron Range	1941-50	1,500,000	1½	101.04	1.31	12	Alex. Brown & Sons, et al.
Erie	1941-50	3,000,000	1⅝	100.143	1.60	6	Mellon Securities Corp., et al.
Illinois Central, Ser. T	1940-49	4,734,000	2½	101.179	2.22	2	Salomon Bros. & Hutzler, et al.
Illinois Central, Ser. U	1941-52	11,016,000	3	Par	Par	..	Reconstruction Finance Corporation
Kansas City Southern, Ser. F[5]	1947-52	1,278,000	3	105.0	2.36	11	Salomon Bros. & Hutzler
Kansas City Southern, Ser. G[6]	1940-50	1,112,000	2½	Par	Par	..	Reconstruction Finance Corporation
Lehigh & New England, Ser. L	1941-50	640,000	1⅞	103.688	1.16	6	Evans, Stillman & Co.
Louisiana & Arkansas	1941-55	1,536,000	3	Par	Par	..	Reconstruction Finance Corporation
Louisville & Nashville, Ser. I	1941-50	6,770,000	1⅜	100.309	1.32	4	Hasley, Stuart & Co., et al.
Missouri Pacific, Ser. DD	1941-50	750,000	2	100.944	1.81	9	Harris Trust & Savings Bank
Mobile & Ohio[7]	1941-55	2,700,000	2½	100.099	2.49	1	Salomon Bros. & Hutzler, et al.
New York Central	1941-50	10,400,000	2	101.054	1.795	6	Gregory & Sons
New York, New Haven & Hartford	1941-50	960,000	2½	103.151	1.87	14	McMaster Hutchinson & Co., et al.
Norfolk Southern, Ser. C	1941-50	136,000	2½	Par	Par	..	Reconstruction Finance Corporation
Norfolk Southern	1941-45	938,000	3	Par	Par	..	Reconstruction Finance Corporation
Northern Pacific	1940-50	5,000,000	2¾	Par	Par	..	Reconstruction Finance Corporation
Pennsylvania, Ser. K	1941-55	7,995,000	2¼	102.65	1.89	7	First Boston Corporation, et al.
Pere Marquette	1941-50	2,220,000	2	101.425	1.727	6	Salomon Bros. & Hutzler, et al.
Seaboard Air Line, Ser. II	1941-54	1,120,000	3	Par	Par	..	Reconstruction Finance Corporation
Southern, Ser. GG	1941-50	7,300,000	1⅞	100.568	1.77	7	Drexel & Co., et al.
Southern, Ser. HH	1941-50	3,000,000	1⅞	100.57	1.77	7	Mellon Securities Corporation
Southern Pacific, Ser. Q	1941-55	11,820,000	2¼	96.777	2.73	2	Halsey, Stuart & Co., et al.
Tennessee Central, Ser. D	1940-50	185,000	2¾	Par	Par	..	Reconstruction Finance Corporation
Wabash, Ser. H[8]	1940-47	9,150,000	2½	Par	Par	..	Reconstruction Finance Corporation
Western Maryland, Ser. H	1941-50	1,890,000	2	98.775	2.25	4	Salomon Bros. & Hutzler, et al.
Wheeling & Lake Erie, Ser. G	1941-50	1,550,000	1	98.870	1.22	11	Mellon Securities Corporation, et al.

1 Issued to refinance at lower interest rates outstanding equipment trust certificates series A and C to L.
2 Issued for delivery to holders of like principal amount of outstanding 3 per cent certificates which matured June 1, 1940.
3 Issued to retire outstanding certificates of indebtedness exchanged for Series I, L, M, N, O, P & Q equipment trust certificates.
4 Issued to retire outstanding conditional-sale agreements covering equipment purchased 1937-40.
5 Represents sale of remainder of $3,195,000 issue originally authorized by the I.C.C. on December 22, 1936.
6 Issued to cover both new equipment and the unpaid balance of $280,739 on conditional-sale contracts covering equipment purchased in 1939.
7 This road was merged with the Gulf, Mobile & Northern to form the Gulf, Mobile & Ohio in September, 1940.
8 Issued to retire outstanding notes held by the R.F.C. and to pay for equipment rehabilitation.

ume of new investment occurred in supplying rolling stock and motive power—both to maintain railroad capacity at a level commensurate with the traffic likely to be developed by the national defense effort, and also (particularly in the case of passenger equipment) to provide services attractive to traffic. The ease with which equipment trust issues are marketed—while it is a providential aid to the carriers in meeting the exigencies of their chronic "emergency"—is no mark whatever of railway financial health. Aside from equipment issues, the only railway securities to be marketed during the year were guaranteed issues of terminal companies and obligations of one or two carriers which are still—because of relatively favorable local traffic conditions and conservative capital structures—in the strictly-limited category of dividend-payers.

Equipment Issues

Equipment trust issues sold in 1939 totaled more than $172,000,000 in principal amount. This is the largest total of such financing in at least a decade, exceeding even 1937—an unusually active year in equipments—and compares with a total of some $93,000,000 sold in 1939. The number of separate issues involved was 39, as compared with 31 in the previous year. The increasing activity in this field is a striking indication of the extent to which the money market has become a borrower's market if he places air-tight security like railway rolling on the counter.

The accompanying table of the principal issues sold in 1940 shows that the roads have been accorded the lowest

Railway Securities Sold by Public Offering in 1916 and 1920 to 1940

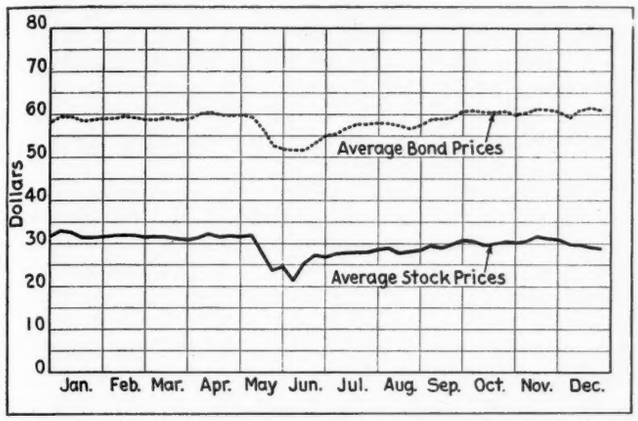
Year	Bonds	Notes	Stock	Total R. R. financing	Total all financing	Per Cent R. R. to total
1916	$229,000,000	$126,000,000	$16,000,000	$371,000,000	$1,864,000,000	19.9
1920	194,583,000	193,840,000	3,737,000	392,160,000	3,324,922,000	12.1
1921	455,125,000	202,928,300	27,222,500	685,275,800	2,780,874,000	24.6
1922	299,025,800	288,936,500	27,068,100	615,030,400	3,200,176,000	19.2
1923	165,956,000	354,720,500	59,140,850	579,817,350	3,602,704,000	16.0
1924	620,347,000	351,276,200	11,000,000	982,623,200	4,185,590,000	23.5
1925	374,020,500	151,753,740	30,934,430	556,708,670	5,234,992,000	10.6
1926	241,954,000	172,477,000	41,577,200	456,008,200	5,746,354,000	7.9
1927	686,939,500	89,184,600	210,596,900	986,721,000	7,830,641,000	12.6
1928	525,719,000	79,911,000	187,369,100	792,999,100	8,473,880,000	9.4
1929	418,984,000	180,322,000	275,269,240	874,575,240	11,007,170,000	7.9
1930	800,694,000	142,168,000	63,805,600	1,006,667,600	5,920,498,000	17.0
1931	453,824,000	105,209,000	.....	559,033,000	2,730,082,000	20.5
1932	11,827,000	13,125,000	.....	24,952,000	684,806,000	3.6
1933	12,000,000	.....	.....	12,000,000	335,812,000	3.6
1934	172,074,000	71,068,000	.....	243,142,000	* 618,627,000	39.3
1935	107,746,000	57,372,000	.....	165,118,000	2,190,093,550	7.6
1936	592,254,000	77,580,000	.....	669,834,000	4,061,901,025	16.5
1937	60,547,000	100,500,000	.....	161,047,000	1,589,043,484	10.1
1938	60,000,000	22,270,000	.....	82,270,000	1,635,196,000	5.0
1939	81,800,000	53,363,000	.....	135,163,000	2,099,036,000	6.4
1940*	213,831,000	108,707,000	.....	322,538,000	2,376,245,000	13.6

* 11 Months Total as Compiled by Dow Jones & Co.

interest costs on record. Two healthy carriers sold issues at the unprecedented annual cost of 1.15 per cent, and a third—a small road—had to pay only 1.16. As a matter of fact, however, the financial community apparently worries little about general fiscal status when it goes out to buy equipment trust issues, for there is but a slight difference in the interest costs obtained by solvent, near-insolvent or actually insolvent roads, all other factors being equal. One bankrupt carrier was accorded a cost of 1.6 per cent on a sizeable issue while another road which found it necessary to effect a plan of interest and maturity deferment recently floated a big one at a cost of 1.59.

As late as 1937, an interest cost of 1.94 for an unusually well-fixed road was described as unprecedented.

Coupon-rates of the certificates show a corresponding downward trend in 1940, an all-time record low rate of 1 per cent being attained by the Bessemer & Lake Erie in a $4,000,000 issue. The maximum rate continues to be 3 per cent, chiefly for issues sold to the Reconstruction Finance Corporation which has established this rate for issues which cover the entire cost of equipment involved



Fluctuations in Average Prices of Twenty Representative Railroad Stocks and Twenty Bonds in 1940

Mileage in the Hands of Receivers or Trustees

(Figures to 1939, Inclusive, from I. C. C. Statistics for Year Ended December 31, 1939. Figures for 1940 Compiled by *Railway Age*.)

Year ended	Miles of road operated by receivers or trustees at close of year	Net change during year in miles of road operated	No. of roads in charge of receivers or trustees at close of year
June 30, 1894	40,819	.....	192
1895	37,856	−2,963	169
1896	30,475	−7,380	151
1897	18,862	−11,614	128
1898	12,745	−6,117	94
1899	9,853	−2,892	71
1900	4,178	−5,675	52
1901	2,497	−1,681	45
1902	1,475	−1,022	27
1903	1,185	−290	27
1904	1,323	+138	28
1905	796	−527	26
1906	3,971	+3,176	34
1907	3,926	−45	29
1908	9,529	+5,603	52
1909	10,530	+1,001	44
1910	5,257	−5,273	39
1911	4,593	−664	39
1912	9,786	+5,193	44
1913	16,286	+6,500	49
1914	18,608	+2,322	68
1915	30,223	+11,615	85
1916	37,353	+7,130	94
Dec. 31, 1916	34,804	−2,550*	80
1917	17,376	−17,428	82
1918	19,208	+1,832	74
1919	16,590	−2,618	65
1920	16,290	−300	61
1921	13,512	−2,778	68
1922	15,259	+1,747	64
1923	12,623	−2,636	64
1924	8,105	−4,518	61
1925	18,687	+10,582	53
1926	17,632	−1,055	45
1927	16,752	−880	40
1928	5,256	−11,496	33
1929	5,703	+447	29
1930	9,486	+3,783	30
1931	12,970	+3,484	45
1932	22,545	+9,575	55
1933	41,698	+19,153	78
1934	42,168	+470	80
1935	68,345	+26,177	87
1936	69,712	+1,367	91
1937	70,884	+1,172	109
1938	76,938	+6,054	109
1939	77,013	+75	108
1940	72,907	−4,106	102

* Represents decrease for six months.

R. F. C. Loans to Railroads as of November 30, 1940

	Disbursed	Repaid
Aberdeen & Rockfish	$127,000	$127,000
Alabama, Tennessee Northern	275,000	90,000
Alton	2,500,000	1,000,000
Ann Arbor (Receivers)	634,757	634,757
Ashley, Drew & Northern	400,000	400,000
Baltimore & Ohio	95,343,399	12,228,219
Birmingham & Southeastern	41,300	41,300
Boston & Maine	47,877,937	7,684,937
Buffalo, Union Carolina	.....	.....
Carlton & Coast	535,800	141,697
Carolina, Clinchfield & Ohio Railway	14,150,000	14,150,000
Central of Georgia	3,124,319	220,691
Central of New Jersey	464,298	464,298
Charles City Western	140,000	59,000
Chicago & Eastern Illinois	5,916,500	155,632
Chicago & North Western	46,588,133	4,338,000
Chicago Great Western	1,289,000	838
Chicago Great Western (Trustees)	150,000	150,000
Chicago, Mil., St. Paul & Pacific	11,500,000	537
Chicago, Mil., St. Paul & Pacific (Trustees)	8,762,000	8,762,000
Chicago, North Shore & Milwaukee	1,150,000	.....
Chicago, Rock Island & Pacific	13,718,700	.....
Chicago, Rock Island & Pacific (Trustees)	2,680,000	2,680,000
Cincinnati Union Terminal	8,300,000	8,300,000
Colorado & Southern	30,055,222	1,561,389
Columbus & Greenville	.....	.....
Copper Range	53,500	53,500
Delaware, Lackawanna & Western	5,100,000	155,000
Denver & Rio Grande Western	8,081,000	500,000
Denver & Rio Grande Western (Trustee)	1,800,000	1,800,000
Denver & Salt Lake Western	3,182,150	71,300
Erie	16,582,000	582,000
Erie (Trustees)	10,000,000	3,200,000
Eureka-Nevada	.....	.....
Florida East Coast (Receivers)	1,867,075	751,075
Fort Smith & Western (Receivers)	227,434	10,000
Fort Worth & Denver City	8,780,422	.....
Fredericksburg & Northern	.....	.....
Gainesville Midland	78,000	12,000
Gainesville Midland (Receiver)	.....	.....
Galveston, Houston & Henderson	3,183,000	1,161,000
Galveston Terminal	546,000	.....
Georgia & Florida (Receivers)	354,721	.....
Great Northern	26,000,000	26,000,000
Green County	13,915	13,915
Gulf, Mobile & Northern	520,000	520,000
Gulf, Mobile & Ohio and Gulf, Mobile & Northern	9,500,000	.....
Illinois Central	45,298,000	655,000
Kansas City Southern	1,112,000	1,112,000
Lehigh Valley	9,278,000	8,517,500
Litchfield & Madison	800,000	800,000
Louisiana & Arkansas	2,309,216	400,000
Maine Central	2,550,000	2,550,000
Maryland & Pennsylvania	197,000	50,000
Meridian & Bigbee River (Trustee)	985,000	.....
Minneapolis, St. Paul & Sault Ste. Marie	6,843,082	6,843,082
Mississippi Export	100,000	100,000
Missouri-Kansas-Texas	5,124,000	2,309,760
Missouri Pacific	23,134,800	.....
Missouri Southern	99,200	99,200
Mobile & Ohio	785,000	785,000
Mobile & Ohio (Receiver)	1,070,599	1,070,599
Murfreesboro-Nashville	25,000	.....
New York Central	36,499,000	36,499,000
New York, Chicago & St. Louis	18,200,000	18,200,000
New York, New Haven & Hartford	7,699,778	919,359
Norfolk Southern (Receivers)	743,000	42,000
Northern Pacific	5,000,000	5,000,000
Pennsylvania	28,900,000	28,900,000
Pere Marquette	3,000,000	3,000,000
Pioneer & Fayette	17,000	12,500
Pittsburgh & West Virginia	9,045,207	4,975,207
Puget Sound & Cascade	300,000	300,000
St. Louis-San Francisco	7,995,175	2,805,175
St. Louis-Southwestern	18,672,250	18,672,250
Salt Lake & Utah (Receiver)	200,000	200,000
Salt Lake & Utah	400,000	215,000
Savannah & Atlanta	1,235,000	26,000
Sand Spring	162,600	162,600
Seaboard Air Line (Receivers)	6,320,000	624,000
Southern Pacific	44,000,000	24,200,000
Southern	50,905,000	30,307,094
Sumpter Valley	100,000	100,000
Tennessee Central	5,332,700	173,700
Texas, Oklahoma & Eastern	.....	.....
Texas & Pacific	2,035,000	700,000
Texas-South-eastern	30,000	30,000
Tuckerton	39,000	39,000
Utah Idaho Central	452,000	200,000
Wabash (Receivers)	25,973,383	10,241,800
Western Pacific	4,366,000	1,403,000
Western Pacific (Trustees)	13,502,921	3,600,000
Wichita Falls & Southern	750,000	400,000
Wrightsville & Tennille	22,525	22,525
Totals	$783,201,022	$315,282,440

as security. The majority of the issues bear interest percentages between 1¾ and 2½.

The factor which has the greatest effect on interest rate and cost is the degree of initial equity which the road invests in the equipment designated as security for the certificates. As noted above, the R. F. C. has established a normal interest basis for 10-year certificates which it purchases at par and accrued dividends as follows: 3 per cent when the road has no equity; 2¾ per cent for a 10 per cent down payment, and 2½ per cent for a 20 per cent down payment. Most of the issues which were sold to the Corporation during the year were so disposed of because the issuing railroad found it undesirable to make any or much initial cash payment and, under such conditions, found the open market less favorable. Interstate Commerce Commissioner Porter has for a number of years refused to give assent to authorizations of issues which represent the entire cost of the equipment and so recorded his dissent in reports concerning three issues this year in which the I. C. C. majority authorized certificates of this character.

Railroads Taken from Receivership or Trusteeship During 1940

Name of Road	Mileage Operated
Chicago & Eastern Illinois	925
Chicago Great Western	1,502
Collins & Glennville	24
Mobile & Ohio	1,181
Oregon, Pacific & Eastern	20
Winchester & Wardensville	23
Total	3,675

Certificates sold to bankers or institutions in 1940 covered 85 per cent of the equipment against which they were issued, on the average. Of some 22 issues involved (excluding issues for refinancing purposes), 7 covered 90 per cent, 9 covered 80 per cent, 5 covered 75 per cent and 1 covered 69½ per cent of total equipment cost. The latter issue—sold at the low interest cost of 1.22—represents an unusually high equity percentage.

Another factor affecting interest cost and coupon rate is that of maturity. Of the two standard maturity periods for serial certificates—10 years and 15 years—the former is by far the most popular, both with banking houses which buy the certificates originally and the ultimate public buyers; hence it usually obtains lower interest for the issuing road. Only five of 1940's issues carry maturity installments running for more than 10 years and in every instance except one the interest costs are somewhat higher than average.

How the equity and maturity factors operate is well illustrated by the experience of one road which applied early in the year for authority to issue certificates covering virtually all the cost of the equipment and maturing serially for 15 years. Later it modified its application to reduce the principal amount of the issue materially, while leaving the cost of equipment subject thereto undisturbed, and shrinking the maturity period from 15 to 10 years. As a result the road was able to cut its coupon rate from 4 to 2 per cent.

Of the total of $172,000,000 principal amount of certificates listed in the accompanying table of principal sales during 1940, about $43,000,000 represents refunding or refinancing of conditional sale contracts, certificates of indebtedness or former equipment trust issues covering

Railroads in the Hands of Receivers or Trustees on December 31, 1940

Road	Mileage operated	Mileage owned	Date of receivership or trusteeship	Long term debt in hands of public	Capital stock in hands of public	Total Securities in hands of public	Receiver's or trustee's certificates outstanding	Principal amount of obligations in default as to principal and/or interest
Akron, Canton & Youngstown	171	19	Apr. 4, 1933	$3,564,000	$1,500,000	$5,579,621	$190,000	$3,550,000
Northern Ohio	....	152	Apr. 4, 1933	2,500,000	570,300	3,070,300	None	2,500,000
Alabama, Tennessee & Northern	218	215	Dec. 15, 1934	3,783,789	1,533,848	5,502,637	73,388	3,783,789
Burlington, Muscatine & Northwestern	11	11	Nov. 16, 1937	None	None	3,000	None	None
California & Oregon Coast	15	15	Feb. 19, 1925	209,226	350,000	559,226	25,000	
Central of Georgia	1864	1405	Dec. 19, 1932 (a)	53,722,000	None	57,501,921	1,806,000	48,882,000
Central Railroad of New Jersey	710	389	Oct. 31, 1939	49,131,000	11,942,800	61,073,800	None	48,731,000
Chicago & North Western	8327	8108	June 28, 1935	315,150,500	180,835,300	543,799,371	None	305,818,500
Chicago, Attica & Southern	154	139	Aug. 4, 1931	441,200	2,294,452	2,735,652	None	441,200
Chicago, Indianapolis & Louisville	549	520	Dec. 30, 1933	26,211,000	1,818,000	31,656,054	None	26,071,000
Chicago, Milwaukee, St. Paul & Pacific	10858	9873	June 29, 1935	453,430,452	224,410,318	681,340,770	22,883,000	263,465,759
Chicago, Rock Island & Pacific	7900	5018	June 7, 1933	249,279,000	128,892,512	396,015,212	27,646,000	155,470,000
Chicago, Rock Island & Gulf	....	710	Oct. 31, 1933	None	None	None	None	None
Choctaw, Oklahoma & Gulf	....	825	Oct. 31, 1933	8,935,000	None	8,935,000	None	None
Peoria Terminal	32(b)	30(b)	Oct. 31, 1933	930,000	None	930,000	None	None
Rock Island, Arkansas & Louisiana	....	376	Aug. 31, 1933	11,453,600	None	11,453,600	None	11,453,600
Rock Island, Memphis Terminal	....	6(b)	Oct. 31, 1933	None	None	None	None	None
Rock Island, Omaha Terminal	....	3(b)	Oct. 31, 1933	None	None	None	None	None
Rock Island, Stuttgart & Southern	....	21	Oct. 31, 1933	None	None	None	None	None
St. Paul & Kansas City Short Line	....	417	Aug. 31, 1933	9,984,355	None	9,984,355	None	None
Chicago, Springfield & St. Louis	87	79	Jan. 24, 1930	500,000	205,060	705,060	None	500,000
Denver & Rio Grande Western	2569	2274	Nov. 1, 1935	124,745,000	16,433,200	144,938,844	5,000,000	120,216,000
Denver & Salt Lake Western	....	38	Nov. 1, 1935	None	None	3,110,850	None	None
Duluth, South Shore & Atlantic	550	447	Jan. 1, 1937	4,276,000	10,800,000	15,076,000	None	3,822,000
Mineral Range	26	26	June 1, 1937	317,071	705,800	1,022,871	None	317,071
Erie	1998	856	Jan. 19, 1938	247,992,700	95,228,100	347,093,569	9,650,000	126,305,000
New Jersey & New York	41	32	July 1, 1938	1,022,960	2,228,600(c)	3,251,560(c)	None	1,022,960
New York, Susquehanna & Western	144	144	June 1, 1937	12,545,908	None	12,545,908	None	10,345,908
Wilkes-Barre & Eastern	(d)	10	Sept. 25, 1937	2,665,000	None	2,665,000	None	2,665,000
Northern Railroad of New Jersey	....	21	Jan. 26, 1939	861,000	1,000,000	1,861,000	None	861,000
Nypano	....	424	July 1, 1938	8,000,000	None	8,000,000	None	None
Florida East Coast	684	679	Sept. 1, 1931	58,358,000	37,500,000	95,858,000	None	45,000,000
Fonda, Johnstown & Gloversville	20	20	Apr. 20, 1933	6,143,000	3,000,000	9,179,875	None	5,700,000
Fort Smith, Subiaco & Rock Island	15	15	July 23, 1938	None	None	None	None	None
Georgia & Florida	408	363	Oct. 19, 1929	7,649,500	13,382,441	22,194,581	600,000	7,562,500
Georgia, Southwestern & Gulf	36	None	Jan. 2, 1933	76,800	14,700	147,650	None	76,800
Albany & Northern	....	35	Jan. 2, 1933	400,000	None	400,000	None	400,000
Louisiana Southern	15	15	Aug. 2, 1933	200,000	100,000	300,000	None	None
Meridian & Bigbee River	50	50	June 15, 1933	500,000	300,000	1,810,000	500,000	500,000
Minneapolis & St. Louis	1512	1417	July 27, 1923	44,561,091	25,792,600	70,353,691	None	43,366,051
Minneapolis, St. Paul & Sault Ste. Marie	3224	3162	Dec. 31, 1937	88,328,472	18,086,700	106,415,172	None	87,333,800
Missouri Pacific	7146	6260	Apr. 1, 1933	387,836,000	154,639,600	573,662,538	None	384,684,000
Boonville, St. Louis & Southern	....	0.18	June 1, 1936	245,000	None	245,000	None	245,000
Cairo & Thebes	....	25	Dec. 1, 1937	1,699,000	None	1,699,000	None	1,699,000
Chester & Mount Vernon	....	64	Dec. 1, 1937	None	None	None	None	None
Fort Smith Suburban	....	7	Dec. 1, 1937	None	None	None	None	None
Marion & Eastern	....	7	Dec. 1, 1937	None	None	None	None	None
Missouri-Illinois	193	133	July 1, 1933	3,031,500	1,102,500	4,134,000	None	None
Missouri Pacific R.R.Corp. in Nebr.	....	349	Apr. 1, 1933	None	None	None	None	None
Natchez & Southern	7	7	Dec. 1, 1937	None	None	None	None	None

Railroads in the Hands of Receivers or Trustees on December 31, 1940—Continued

Road	Mileage operated	Mileage owned	Date of receivership or trusteeship	Long term debt in hands of public	Capital stock in hands of public	Total Securities in hands of public	Receiver's or trustee's certificates outstanding	Principal amount of obligations in default as to principal and/or interest
New Orleans, Texas & Mexico	191	173	July 1, 1933	$42,970,000	$14,832,900	$57,802,900	None	$42,970,000
Asherton & Gulf	32	32	Dec. 1, 1937	None	None	None	None	None
Asphalt Belt	18	18	Dec. 1, 1937	None	None	None	None	None
Beaumont, Sour Lake & Western	146	84	July 1, 1933	None	None	None	None	None
Houston North Shore	.....	27	July 1, 1933	None	None	None	None	None
Houston & Brazos Valley	38	38	Dec. 1, 1937	None	None	None	None	None
International—Great Northern	1155	1101	Apr. 1, 1933	46,112,000	None	46,544,971	None	45,750,000
Austin Dam & Suburban	....	2(e)	Dec. 1, 1937	None	None	None	None	None
New Iberia & Northern	104	65	Dec. 1, 1937	None	None	None	None	None
Iberia, St. Mary & Eastern	....	40	Dec. 1, 1937	None	None	None	None	None
Orange & Northwestern	62	62	Dec. 1, 1937	None	None	None	None	None
Rio Grande City	21	18	Dec. 1, 1937	None	None	None	None	None
St. Louis, Brownsville & Mexico	602	556	July 1, 1933	174,000	None	174,000	None	None
San Antonio Southern	45	29	Dec. 1, 1937	None	None	None	None	None
San Antonio, Uvalde & Gulf	317	314	July 1, 1933	None	None	None	None	None
San Benito & Rio Grande Valley	128	128	Dec. 1, 1937	None	None	None	None	None
Sugar Land	53	31	Dec. 1, 1937	None	None	None	None	None
Nevada Copper Belt	30	41	Apr. 2, 1925	622,000	1,000,000	1,622,000	None	622,000
New York, New Haven & Hartford	1866	1230	Oct. 23, 1935	248,989,034	206,155,300	479,356,786	None	229,512,034
Hartford & Connecticut Western	....	21	July 30, 1936	None	338,200	338,200	None	None
Old Colony	....	457	June 3, 1936	14,348,200	12,500,200	28,248,400	None	14,348,200
Boston & Providence	....	60	Aug. 4, 1938	2,170,000	3,144,200	5,314,200	None	2,170,000
Providence, Warren & Bristol	....	14	Feb. 13, 1937	None	44,900	44,900	None	None
New York, Ontario & Western	576	318	May 20, 1937	30,367,948	58,114,043	89,537,641	None	30,367,948
Norfolk Southern	734	734	July 28, 1932	16,572,000	16,000,000	32,572,000	None	15,401,000
Pittsburg, Shawmut & Northern	190	156	Aug. 1, 1905	14,655,600	15,000,000	29,655,600	$2,044,350	14,655,600
Rio Grande Southern	172	172	Dec. 16, 1929	4,509,000	4,510,000	9,019,000	31,000	4,509,000
Rutland	407	413	May 5, 1938	9,256,000	9,080,300	18,336,300	None	9,256,000
St. Louis-San Francisco	5048	4980	Nov. 1, 1932(f)	272,508,767	114,701,526	400,844,588	None	268,094,767
St. Louis Southwestern & Affiliated Cos.	1649	1439	Dec. 12, 1935	45,218,680	4,682,900	73,628,905	None	23,683,680
Santa Fe, San Juan & Northern	....	32	Oct. 14, 1931	Data not available				
Seaboard Air Line	4314	3335	Dec. 23, 1930	163,516,638	85,110,662	248,627,300	21,809,900	39,431,676
Georgia, Florida & Alabama	....	192	Nov. 7, 1931	1,750,000	1,000,000	2,750,000	None	1,750,000
Seaboard-All Florida	....	184	Feb. 2, 1931	12,824,738	None	12,824,738	None	12,824,738
East and West Coast	side track		Feb. 2, 1931	583,018	None	583,018	None	583,018
Florida Western & Northern	....	233	Feb. 2, 1931	13,578,744	None	13,578,744	None	13,578,744
Chesterfield & Lancaster	33	32	Apr. 14, 1931	186,000	None	186,000	None	186,000
Raleigh & Charleston	20	20	May 1, 1931	550,000	None	550,000	None	550,000
South Dayton	....	1	Jan. 12, 1937	Data not available				
Spokane International	152	139	Aug. 28, 1933	4,200,000	58,200	4,258,200	None	4,200,000
Coeur D'Alene & Pend D'Oreille	....	21	Aug. 30, 1933	544,000	None	544,000	None	544,000
Tallulah Falls	57	57	June 25, 1923	None	None	None	None	None
Virginia & Truckee	47	68	Apr. 27, 1938	None	5,000,000	5,000,000	10,250	None
Wabash	2409	1952	Dec. 1, 1931	130,851,026	138,120,767	268,971,793	20,885,994	122,310,826
Ann Arbor	294	294	Dec. 4, 1931	7,000,200	40,800	7,041,000	None	None
Waco, Beaumont, Trinity & Sabine	41	41	Feb. 8, 1930	390,000	1,113,000	1,503,000	12,734	
Western Pacific	1208	1153	Aug. 2, 1935	51,437,100	75,800,000	137,879,524	10,000,000	49,290,100
Wichita Northwestern	(g)	99	Nov. 10, 1922	381,750	1,690,000	2,071,750	43,000	381,750
Wilmington, Brunswick & Southern	30	30	Mar. 17, 1933	93,750	165,000	258,750	None	None
Wisconsin Central	1130	996	Dec. 2, 1932	36,434,000	791,000	37,225,000	None	33,513,000
Yosemite Valley	78	78	Dec. 22, 1936	2,318,000	1,448,775	3,963,400	None	2,318,000
Yreka Western	8	8	Sept. 16, 1935	None	None	1,355	16,000	35,391(h)

(a) Changed to trusteeship June 19, 1940.
(b) Yard tracks and sidings.
(c) A majority of the stock is owned by the Erie.
(d) Ceased operations March 26, 1939.
(e) Yard switching tracks.
(f) Changed to trusteeship May 16, 1933.
(g) Interstate Commerce Commission has authorized abandonment of entire line, service on which had been temporarily suspended pending I.C.C. decision.
(h) Debt prior to receivership.

Note:—The effort has been made, in the above table, to list only those securities of bankrupt carriers which are actually in the hands of the investing public—and to exclude securities of one carrier held by an affiliated carrier. Where securities are held by other railways not affiliated with the issuing company, however, they are included in the above list as publicly held. Owing to the complexities of some corporate structures, the decision as to the fact of public or other-carrier ownership has perforce, in some instances, been arbitrary. The purpose has been to give a general picture of the public stake in bankrupt carriers rather than a comprehensive tabulation of legal obligations.

equipment purchased in previous years. One lot of certificates listed are a portion of an issue authorized several years ago which was kept in the railroad treasury unsold until this year when the market for their sale became more favorable.

Another issue was refinancing in part and in part for the rebuilding of equipment.

The extent to which money has become "cheap" is strikingly indicated by these refinancing operations. One road this year sold a $20,000,000 issue bearing 2½ per cent interest to retire an equal amount of 3½ per cent certificates of indebtedness, thereby saving approximately $800,000 in interest charges. Another carrier was able to sell two issues, each bearing a coupon rate of 2½ per cent, to retire outstanding 4 per cent equipment certificates, and will benefit by total savings in interest of some $49,000 to maturity.

The remaining principal amount of about $129,000,000 of issues sold in 1940 represents money for new equipment ordered in 1940 or the latter part of 1939 and is a significant measure of the steps the railroads are taking to meet the requirements of today's business and traveling public and the national defense by capitalizing on the unusually favorable state of the money market.

Dividend Changes

Due to modestly expanding traffic and earnings, several companies during the year were able to restore or increase their dividend payments. Still, the number of companies which pay anything whatever to their equity-holders remains but a handful. One company, heretofore a good earner, was forced to suspend dividend payments because of an unfavorable local traffic situation. Some of the more noteworthy changes in dividends inaugurated during the year are set forth in the following:

The Alabama Great Southern in 1940 paid $9 per share on both its preferred and common, compared to $8 in 1939.

The Atchison, Topeka & Santa Fe in November resumed dividends on its common stock with a payment of $1—the first disbursement since 1937.

The Bangor & Aroostook's directors in February took no action on a common dividend—a total of $2.37 having been paid in 1939. In November the quarterly dividend of $1.25 due January 1 on the company's preferred was deferred.

The Canadian Pacific declared a 2 per cent dividend on its preferred stock in both August and December, no dividends having been paid on this issue in 1939.

Summary of Railroad Receiverships and Trusteeships, 1876 to 1940

Year	Roads Placed in Receivership or Trusteeship: Number of roads	Miles	Bonds and stocks	Roads Taken from Receivership or Trusteeship *: Number of roads	Miles	Bonds and stocks
1876	42	6,662	$467,000,000	30	3,840	$217,848,000
1877	38	3,637	220,294,000	54	3,875	198,984,000
1878	27	2,320	92,385,000	48	3,906	311,631,000
1879	12	1,102	39,367,000	65	4,909	243,288,000
1880	13	885	140,265,000	31	3,775	263,882,000
1881	5	110	3,742,000	29	2,617	137,923,000
1882	12	912	39,074,000	16	867	65,426,000
1883	11	1,990	108,470,000	18	1,354	47,100,000
1884	37	11,038	714,755,000	15	710	23,504,000
1885	44	8,836	385,460,000	22	3,156	278,394,000
1886	13	1,799	70,346,000	45	7,687	374,109,000
1887	9	1,046	90,318,000	31	5,478	328,181,000
1888	22	3,270	186,814,000	19	1,596	64,555,000
1889	22	3,803	99,664,000	25	2,930	137,815,000
1890	26	2,963	105,007,000	29	3,825	182,495,000
1891	26	2,159	84,479,000	21	3,223	169,069,000
1892	36	10,508	357,692,000	28	1,922	95,898,000
1893	74	29,340	1,781,046,000	25	1,613	79,924,000
1894	38	7,025	395,791,000	42	5,643	318,999,000
1895	31	4,089	369,075,000	52	12,831	761,791,000
1896	34	5,441	275,597,000	58	13,730	1,150,377,000
1897	18	1,537	92,909,000	42	6,675	517,680,000
1898	18	2,069	138,701,000	47	6,054	252,910,000
1899	10	1,019	52,285,000	32	4,294	267,534,000
1900	16	1,165	78,234,000	24	3,477	190,374,000
1901	4	73	1,627,000	17	1,139	85,808,000
1902	5	278	5,835,000	20	693	39,788,000
1903	9	229	18,823,000	13	555	15,885,000
1904	8	744	36,069,000	13	524	28,266,000
1905	10	3,593	176,321,000	6	679	20,307,000
1906	6	204	$55,042,000	8	262	$10,400,000
1907	7	317	13,585,000	6	114	13,777,000
1908	24	8,009	596,359,000	3	138	2,547,000
1909	5	859	78,095,000	12	2,629	250,033,000
1910	7	735	51,427,500	17	1,100	93,660,109
1911	5	2,606	210,606,882	13	1,386	40,741,543
1912	13	3,784	182,112,497	12	661	25,910,990
1913	17	9,020	477,780,820	6	1,159	86,163,850
1914	22	4,222	199,571,446	9	1,470	83,189,500
1915	12	20,143	1,070,808,628	11	3,914	285,258,782
1916	9	4,439	208,159,689	26	8,355	703,444,855
1917	19	2,486	61,169,962	20	10,963	557,846,348
1918	8	3,519	242,090,800	11	763	24,735,187
1919	7	244	11,886,779	8	459	15,479,587
1920	10	541	21,620,150	7	380	7,676,200
1921	14	1,744	63,872,113	11	4,173	306,123,942
1922	12	4,330	329,114,860	15	6,151	299,491,646
1923	10	2,218	87,913,581	8	637	14,622,900
1924	11	920	30,223,372	14	3,992	269,251,082
1925	6	11,368	680,422,080	6	638	9,965,000
1926	6	88	2,821,400	12	12,852	626,662,708
1927	6	924	45,236,674	5	142	4,254,000
1928	1	19	529,000	4	209	6,393,250
1929	3	634	30,981,391	5	562	20,715,065
1930	4	4,752	277,323,994	2	1,048	124,668,500
1931	19	5,195	432,151,526	2	102	993,860
1932	13	11,817	626,577,314	8	394	8,575,178
1933	18	21,222	1,229,678,183	2	298	16,133,000
1934	1	81	460,000	2	40	1,598,600
1935	16	29,018	2,182,979,167	5	436	9,146,800
1936	4	8	43,026,400	3	122	7,507,961
1937	23	1,937	186,136,861	2	179	5,455,810
1938	9	6,194	660,997,669	8	290	.....
1939	3	733	78,858,800†	4	401	.....
1940	..	....	.....	6	3,675	.....

* Prior to 1938 these figures covered foreclosure sales only.
† Represents long term debt and stock outstanding.

The Chesapeake & Ohio in December declared an extra common dividend, which brought total 1940 disbursements on this issue to $3.375 per share, as compared with $2.625 in 1939.

The Cincinnati, New Orleans & Texas Pacific in May declared a dividend of $3 on its new common stock (5-to-1 split), and another of $5 on the same issue in November.

The Great Northern in November declared a dividend of 50 cents on its preferred stock, the first disbursement to be made since 1937.

The Louisville & Nashville during the year paid a total of $6 per share on its stock, compared to total disbursements of $5 in 1939.

The Nashville, Chattanooga & St. Louis in January resumed dividends on its stock (the first to be paid since 1931) by the disbursement of $1 per share.

The Pennsylvania in 1940 paid a total of $1.50 per share on its stock, as compared with $1 in 1939.

The Pittsburgh & Lake Erie in 1940 paid dividends totaling $5.50 per share on its stock, compared with $3.50 paid in 1939.

The Virginian in December declared an extra dividend on its common stock at 62.5 cents per share.

The Western Maryland in October declared a dividend of $7 on its first preferred stock, the last preceding payment on which was made in 1937.

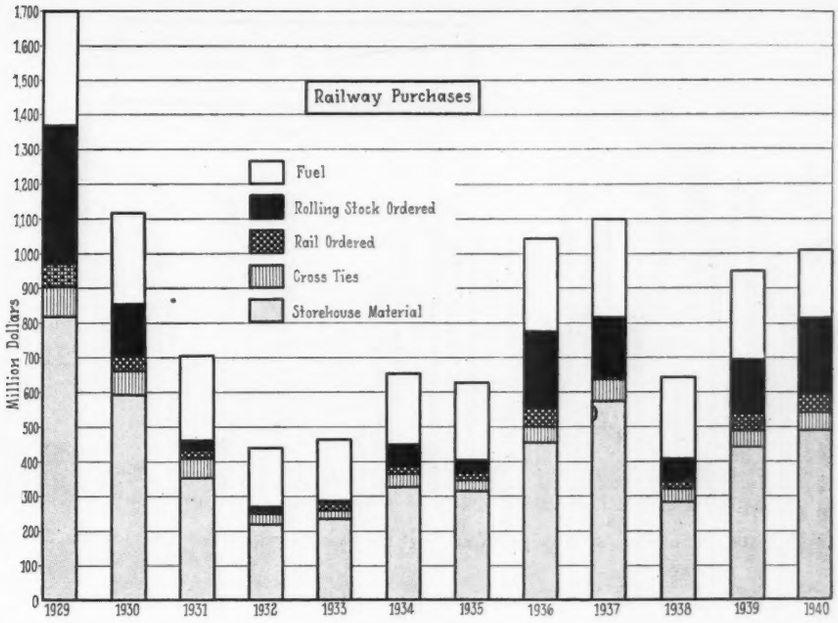
The Wheeling & Lake Erie in December declared an extra dividend of $1.50 on its common stock—bringing payments during the year to a total of $5.50, as compared with $4 paid in 1939.

Bankruptcies and Reorganizations

A beginning was made in 1940 of completing the reorganization of the large number of bankrupt railroads. According to information furnished to *Railway Age* by these carriers as the year drew to a close, the reorganization of six bankrupt companies was expected to be substantially completed by the end of 1940—although, in the case of two or three of them, possibly formal legal termination of the receivership or trusteeship may not have been fully achieved by that time. (In this connection, it will be noted that our listing of bankruptcies terminated does not tally in some respects with that given in an article elsewhere herein by Dr. Julius H. Parmelee—a lack of correspondence due, doubtless, to slightly differing criteria as to exactly when a bankruptcy may be said to have been terminated.)

Our tabulation shows a mileage of 72,907 of railways of all classes still in the hands of the courts at the end of 1940—a decrease of over 4,000 miles during the year. Still, the proportion of the country's railway mileage continuing in receivership or trusteeship remains at almost 30 per cent. The companies being reorganized (not under the old method of composition any more—but strictly by direction of the Interstate Commerce Commission) are being subjected to a vigorous "wringer" operation, in most cases wiping out the equity holders of the old companies. There is a "wringer school" of financial opinion (to be found, notably, among certain politicians, some labor leaders and persons of a "leftish" brand of economic outlook generally) which holds to the view that the way to re-establish railroad credit is to reduce capital, however drastically, to conform to depression-time earning power. Those who oppose this view contend (1) that the conditions which are cutting down railroad earning power are not corrected merely by writing down capital and (2) that harsh dealing with existing investors is not necessarily a sure means of enticing further capital from the thrifty public. Be that as it may, of 25 bankrupt companies for which reorganization plans had been approved up to July 31, 1940, by the I. C. C. or its examiners, fixed interest obligations

(*Continued on page 77*)



Twelve Years of Railway Buying

Railway Buying Again Exceeds A Billion Dollars

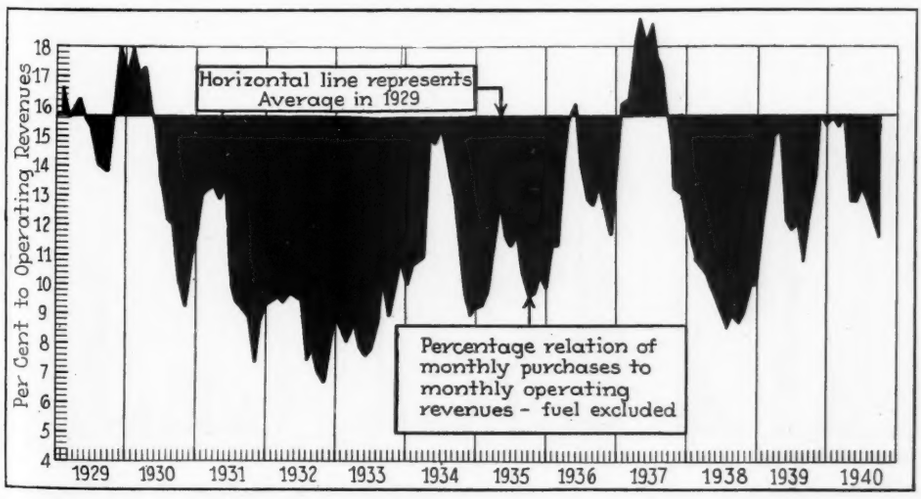
One hundred million dollar gain over 1929 indicated by first totals for 1940—Deferred buying still large

By D. A. Steel

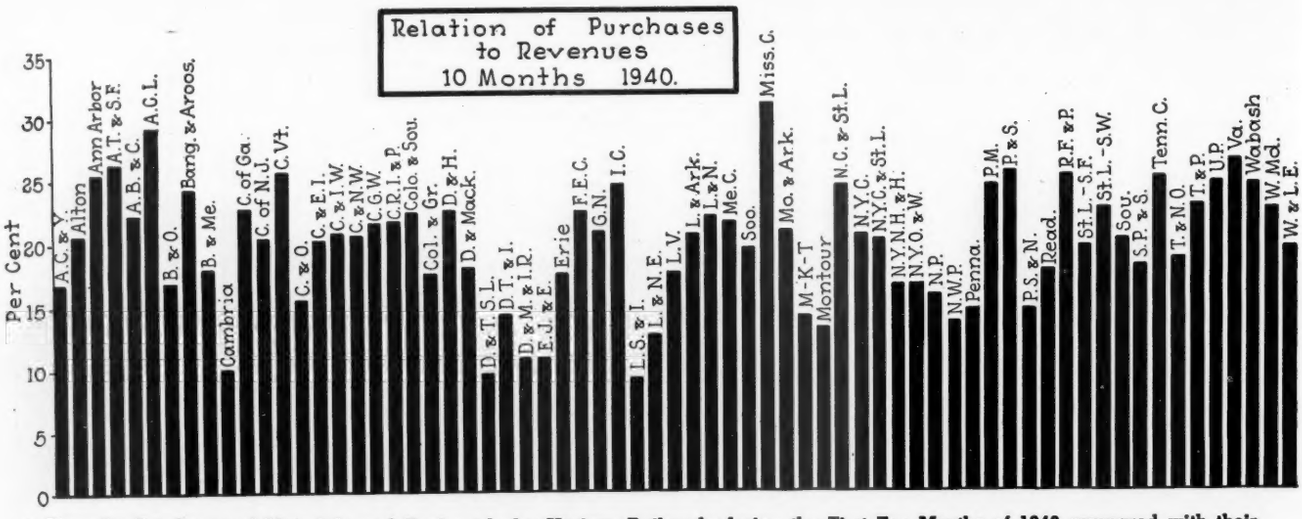
Purchases and Stores Editor

AGGREGATE buying for rail transportation in the United States last year amounted to approximately $1,142,845,000, as nearly as can be determined with the information available at this time. This is about $128,252,000, or 13 per cent more than the corresponding total for 1939. The first totals for 1940 include $850,601,000 of materials, supplies and fuel received by Class I railroads, $35,000,000 of materials and fuel for switching and terminal companies and short lines, $23,500,000 of materials and supplies purchased by the Pullman Company and private car lines for operating and maintaining their facilities and $233,744,000 of new locomotives and cars ordered by the carriers and other concerns from equipment builders.

The totals include materials ordered in 1939 for delivery in 1940 and also the freight paid to foreign lines,



Fluctuations in Month-to-Month Relation of Purchases to Revenues. Black Areas below Normal Line Indicate Deficiency and Add up to $1,094,000,000



How the Purchases of Materials and Fuel made by Various Railroads during the First Ten Months of 1940 compared with their corresponding Operating Revenues

but exclude payments for rent, heat, light and energy and other services, also materials furnished by contractors of railway construction. Cars and locomotives ordered from railroad shops are not included with equipment, to avoid duplicating purchases reported as material and all figures are distinguished from charges to railway operating expenses as materials are used and with capital expenditures which account for equipment when installed and include charges for railroad labor.

Railway Purchases—Supplies and Equipment—Twelve Months

	Materials received from mfrs. (000)	Equipment ordered from mfrs. (000)	Total from mfrs. (000)	Fuel (000)	Total including fuel (000)
Class I Roads					
1929	$991,795	$397,121	$1,388,916	$336,805	$1,725,721
1930	727,223	146,471	873,694	308,277	1,181,971
1931	451,651	28,873	480,524	243,349	723,875
1932	268,100	2,623	270,723	177,000	447,723
1933	276,846	5,857	282,703	180,703	463,607
1934	395,012	66,850	461,862	209,488	671,350
1935	365,830	35,696	401,526	228,720	630,246
1936	555,841	222,594	778,435	266,463	1,044,898
1937	679,402	173,320	852,722	282,366	1,135,088
1938	343,033	74,006	417,039	239,778	656,817
1939	512,494	188,838	701,332	257,880	959,212
1940	589,128	233,374	822,502	261,473	1,083,975
All U. S. Railroads and Car Lines					
1939	556,404	188,838	745,242	269,351	1,014,593
1940	636,128	233,744	869,872	272,973	1,142,845

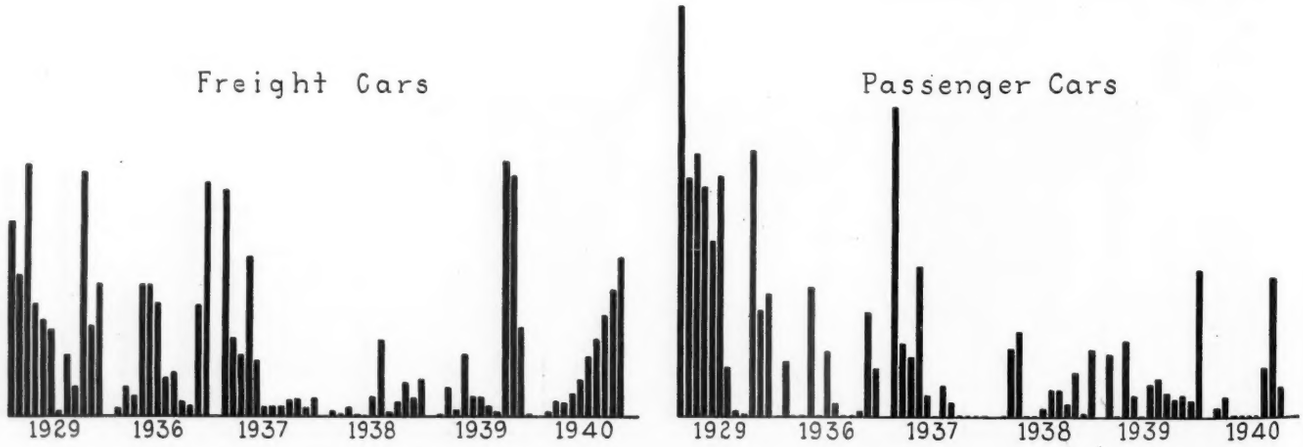
Subject to revision.

Railway buying was stimulated last year by the greatly increased industrial operations created by government spending for national defense but the railroads did not rush into the market with the start of last year's war boom as they did in the fall of 1939 and, until October, aggregate receipts of material were smaller than in the spring because of the unusually large carry-over of materials from 1939 and their liquidation during subsequent months. The recession in materials was not large, however, and the positive gains in equipment buying carried aggregate purchasing in 1940 well over 1939.

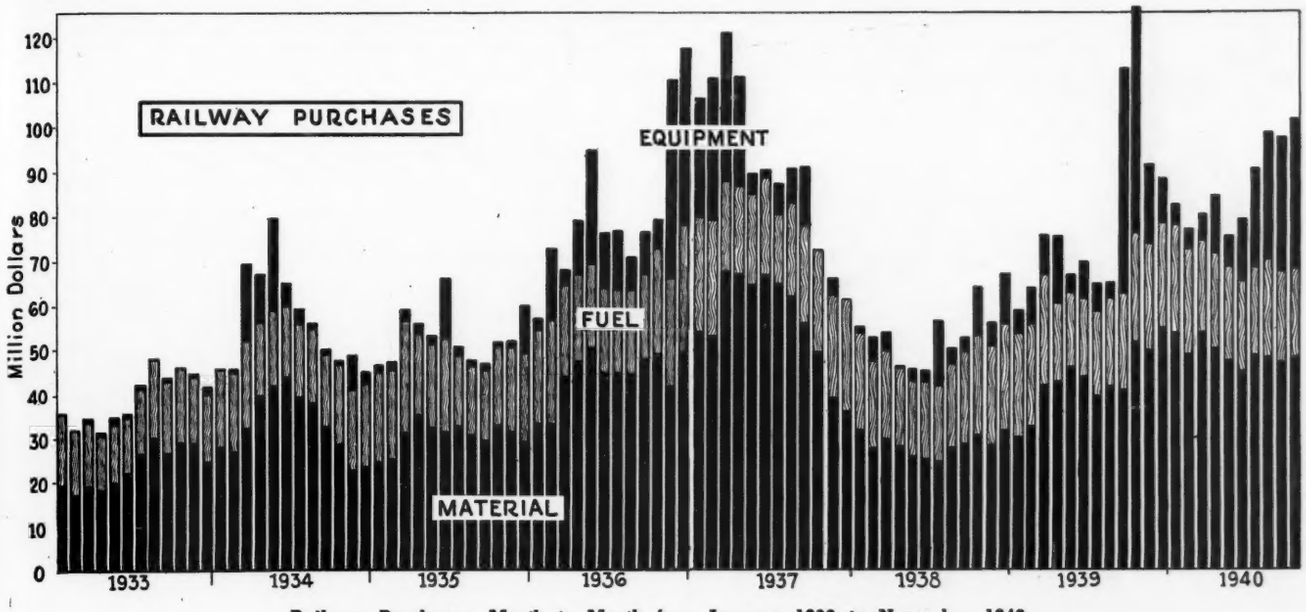
$822,502,000 from Manufacturers

As compiled, the totals for 1940 include $589,128,000 of materials, exclusive of fuel, received by the Class I railroads from manufacturers in 1940, which with $233,744,000 of equipment ordered from builders, brought aggregate purchases of materials and equipment from manufacturers to $822,502,000. (The purchases of materials made by the short lines and private car lines are omitted from these totals to simplify comparisons with previous years.) Fuel totaled $261,473,000. The purchases of materials from manufacturers was larger by $76,634,000 or 15 per cent than the corresponding purchases in 1939 and they were 70 per cent larger than in 1938, while falling short of the purchases in 1937 by 14 per cent and of the purchases in 1929 by $402,667,000 or 41 per cent.

The equipment ordered from builders in 1940 was an



Month to Month Trends in Purchases of New Equipment



Railway Purchases, Month to Month from January 1933 to November 1940

increase of $44,536,000 or 24 per cent over 1939, and an increase of $159,368,000 or 210 per cent over 1938, and exceeded the corresponding purchases in 1937 by $60,-054,000 or 35 per cent. The total was smaller, however, than the corresponding purchases in 1929 by $163,747,-000 or 41 per cent.

The combined purchases of materials and equipment, exclusive of fuel, from manufacturers in 1940 exceeded the 1939 total by $121,170,000 or 17 per cent and they exceeded the 1938 totals by $405,463,000 or 98 per cent but were smaller than the 1937 totals by 4 per cent, and were less than the 1929 totals by $566,414,000 or 41 per cent. Fuel purchases were not appreciably different than in 1939.

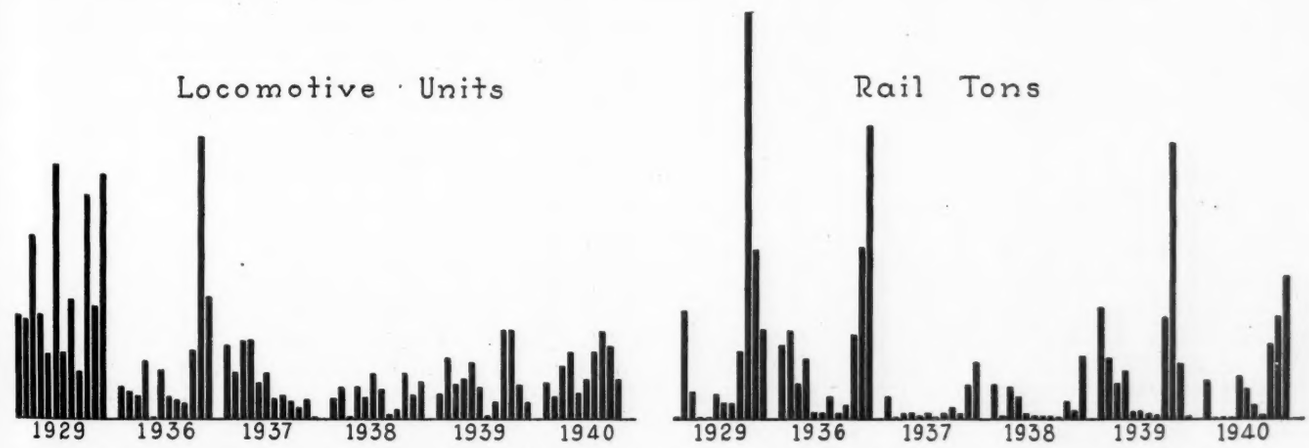
Approximately $43,964,000 of rail was delivered to the railroads last year, as compared with $38,340,000 in 1939 and approximately $48,838,000 of cross ties were received, as compared with $39,759,000 in 1939, while the materials purchased for car and locomotives and other maintenance work totaled $496,326,000 as compared with $434,394,000 in 1939.

The Chicago, Rock Island & Pacific; the Lehigh Valley; the Missouri-Kansas-Texas; the New York, Ontario & Western; the St. Louis-San Francisco; the St. Louis Southwestern; the Spokane, Portland & Seattle; and the Union Pacific made smaller purchases in the the first 10 months of 1940 than in the first 10 months of 1939 but the reports of practically all other roads showed gains over the same period and the gains were more than

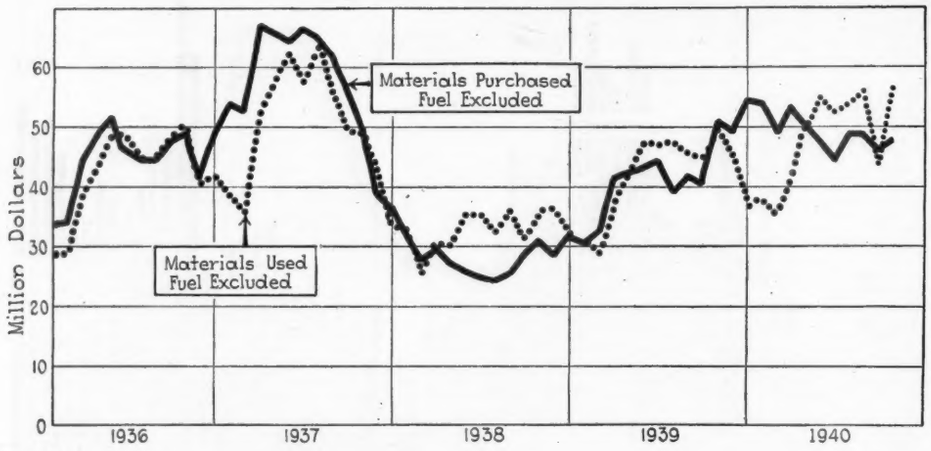
Railway Purchases—Materials and Supplies

	Fuel (000)	Rail (000)	Cross ties (000)	Other Material (000)	Total (000)	Total Less Fuel (000)
			Year 1939			
Jan.	$23,377	$483	$2,445	$27,374	$53,679	$30,302
Feb.	23,063	2,934	2,632	26,721	55,350	32,287
March	24,361	4,631	3.660	33,467	66,119	41,758
April	17,833	5,370	3,297	33,842	60,342	42,509
May	16,925	6,569	3,697	35,651	62,842	45,917
June	17,783	5,893	3,742	33,956	61,374	43.591
July	19,502	2,293	3,157	33,749	58,701	39,199
August ...	20,446	2,761	3,779	34,741	61,727	41,281
Sept.	21,292	2,000	3,357	35,410	62,059	40,767
Oct.	24,381	2,436	3,221	45,407	75,445	51,064
Nov.	24,254	1,778	2,967	44,918	73,917	49,663
Dec.	24,663	1,192	3,805	49,159	78,819	54,156
12 Mos...	$257,880	$38,340	$39,759	$434,395	$770,374	$512.494
			Year 1940			
Jan.	$24,628	$3,282	$4,299	$45,879	$78,088	$53,460
Feb.	23,879	4,478	4,091	40,189	72,637	48,758
March	21,574	5,619	4,826	42,923	74,942	53,368
April	21,273	6,017	4,774	39,655	71.719	50,446
May	21,545	4,668	4,987	37,355	68,555	47,010
June	19,879	4,670	4,838	34,726	64,113	44,234
July	20,582	4,251	4.471	39,694	68,998	48,416
August ...	21,818	2,162	4,059	42,280	70,319	48,501
Sept.	21,273	1,726	3,522	41,032	67,553	46,280
Oct.*	23,022	2,591	3,471	45,593	74.677	51,655
Nov.*	21,000	2,500	3,000	42,000	68,500	47,500
Dec.*	21,000	2,000	2,500	45,000	70,500	49,500
12 Mos...	$261,473	$43,964	$48,838	$496,326	$850,601	$589,128

* Subject to revision.



Freight Cars in Hundreds, Locomotives and Passenger Cars in Units



Purchases and Consumption of Railway Materials

20 per cent on 35 railroads. The increases amounted to 37 per cent on the Alton, 34 per cent on the Atlantic Coast Lines, 36 per cent on the Baltimore & Ohio, 20 per cent on the Central of Georgia, 34 per cent on the Central of New Jersey, 22 per cent on the Central Vermont, 39 per cent on the Delaware & Hudson, 47 per cent on the Detroit, Toledo & Ironton, 30 per cent on the Duluth, Missabe & Iron Range, 33 per cent on the Illinois Central, 35 per cent on the Louisville & Nashville, 22 per cent on the Nashville, Chattanooga & St. Louis, 23 per cent on the N. Y. Central, 26 per cent on the New York, Chicago & St. Louis, 33 per cent on the Pennsylvania, and 117 per cent on the Virginian. The purchases of materials and supplies and fuel in the first 10 months of 1940 totaled more than 20 per cent of operating revenues on 35 railroads.

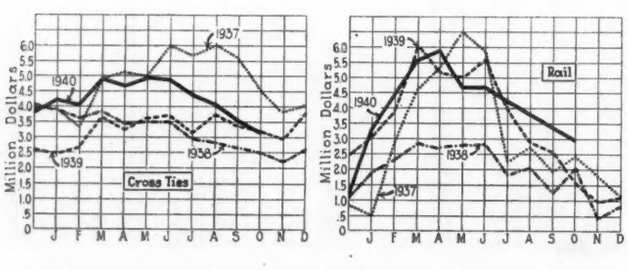
While the railroads received more material in the aggregate last year than in 1939, purchases of rail, ties and miscellaneous materials were smaller in October, 1940, than during the first three months of the year and they were only one per cent larger than in October, 1939. This contrasted with the purchases of new locomotives and cars, which were ordered in increasing amounts each month last year, reaching the total of $30,464,000 in September, $36,133,000 in October, and $36,061,000 in November. Over-size inventories brought on by the increased buying in the little war boom of 1939 and promises by manufacturers not to raise prices appear to explain the apparent failure of material purchases to respond more fully to the increases in industrial activity prior to October, 1940.

Purchases of Material and Fuel—10 Months

Road	1940	Per Cent of Operating Revenue	1939	Per Cent Increase
A. C. & Y.	$ 334,461	16.9	$ 286,056	17
Alton	3,568,455	21.2	2,602,088	37
Alton & Sou.	280,224	...	231,762	27
Ann Arbor	872,159	25.2	749,482	17
A. T. & S. F.	36,761,624	26.5	30,474,454	21
A. B. & C.	634,254	22.3	585,007	8
A. C. L.	11,413,734	28.5	8,518,306	34
B. & O.	27,973,237	18.9	20,548,027	36
Bang. & Aroos.	997,204	24.4	915,986	9
Bost. & Me.	6,981,423	17.9	6,133,400	14
Cambria & Ind.	126,581	9.9	127,305	– 1
Cent. of Ga.	3,395,848	24.8	2,819,337	20
Cent. of N. J.	6,947,463	20.1	5,190,334	34
Cent. of Vt.	1,351,342	25.2	1,116,536	22
Char. & W. C.	625,181	29.0	487,621	13
C. & O.	17,105,470	15.2	14,236,073	20
C. & E. I.	2,599,041	20.1	2,190,878	19
C. & I. M.	792,143	20.7	563,287	14
C. & N. W.	14,694,946	19.0	13,150,216	12
C. B. & Q.	16,267,606	20.4	16,153,951	1
C. G. W.	3,270,838	21.5	3,234,830	1
C. R. I. & P.	14,396,475	21.4	14,906,156	– 3
C. St. P. M. & O.	3,563,980	45.2	3,464,469	3
Colo. & Sou.	1,187,220	22.4	1,171,868	1
Col. & Gr.	170,385	17.4	282,991	61
D. & H.	4,883,628	22.0	3,518,010	39
Det. & Mack.	122,298	17.8	136,376	–10
D. & T. S. L.	282,255	9.2	282,430	0
D. T. & I.	856,493	14.1	580,548	48
D. M. & I. R.	2,697,473	10.7	2,076,129	30
D. S. S. & A.	504,970	24.6	333,497	50
E. J. & E.	1,917,764	10.9	1,663,687	12
Erie	12,564,928	17.4	12,092,835	11
F. E. C.	1,985,475	22.4	1,505,303	12
Ft. W. & D. C.	1,135,442	23.2	1,105,587	3
Gt. Nor.	19,061,565	21.9	16,518,056	15
I. C.	23,272,886	24.8	18,230,352	33
Ill. Term.	891,324	17.7	852,270	4
K. C. Term.	739,166	...	642,278	15
L. S. & I.	285,261	8.9	201,655	41
L. & N. E.	460,844	12.5	456,997	1
Lehigh Val.	6,855,853	17.5	7,009,684	– 2
La. & Ark.	1,383,060	20.3	1,193,416	16
L. & N.	17,644,741	22.0	13,006,078	35
Me. Cent.	2,168,161	21.4	1,980,649	9

Purchases of Material and Fuel—10 Months (Continued)

Road	1940	Per Cent of Operating Revenue	1939	Per Cent Increase
Soo.	5,220,134	19.8	4,381,448	19
Miss. Cent.	201,114	30.7	152,142	33
Mo. & Ark.	205,887	20.8	178,952	15
M-K-T	3,033,631	13.2	3,254,835	– 7
Montour	263,410	13.7	239,870	9
N. C. & St. L.	3,147,682	24.9	2,573,201	22
N. Y. C. Sys.	66,205,162	20.5	53,884,222	23
N. Y. C. & St. L.	7,594,489	20.0	6,035,284	26
N. Y. N. H. & H.	11,609,624	16.1	10,904,695	6
N. Y. O. & W.	975,853	21.2	1,167,164	–14
Nor. Pac.	11,674,599	20.5	11,523,570	1
Northwest Pac.	365,901	13.2	375,350	– 3
Penna.-Long Is.	60,268,613	14.5	45,413,600	33
P.-R. S. S.	755,246	14.7	848,342	–11
P. & P. U.	307,500	...	285,964	7
Pere Mar.	6,567,948	24.2	5,438,209	20
Pitt. & Shaw.	275,076	25.4	135,041	21
P. S. & Nor.	146,389	14.5	118,462	24
Reading	8,875,654	17.0	7,166,733	24
R. F. & P.	1,969,971	25.1	1,685,110	17
St. L.-S. F.	7,558,675	19.5	8,477,928	–11
St. L.-S. W.	3,810,369	22.6	4,160,154	– 8
Sou.	22,599,963	19.8	20,651,001	9
S. P.-Pac. Sys.	29,923,227	20.7	26,507,442	13
S. P. & S.	1,408,610	17.7	1,616,199	–13
Tenn. Cent.	543,172	25.0	399,938	36
Term. of St. L.	1,550,648	...	1,270,416	22
T. & N. O.	6,493,234	17.4	5,143,843	26
Tex. & Pac.	4,960,605	22.9	4,157,496	20
U. P. Sys.	33,389,173	24.3	37,318,241	–10
Utah	96,440	14.5	69,012	40
Va.	5,556,952	26.2	2,547,585	117
Wabash	9,229,963	24.5	6,864,339	14
West. Md.	3,495,435	22.4	3,185,018	10
West. Pac.	2,695,200	18.0	2,714,000	– 1
W. & L. E.	2,719,347	19.1	1,769,368	15
W. F. & S.	42,173	...	....	..
Bur.-R. I.	48,234	4.7	....	..



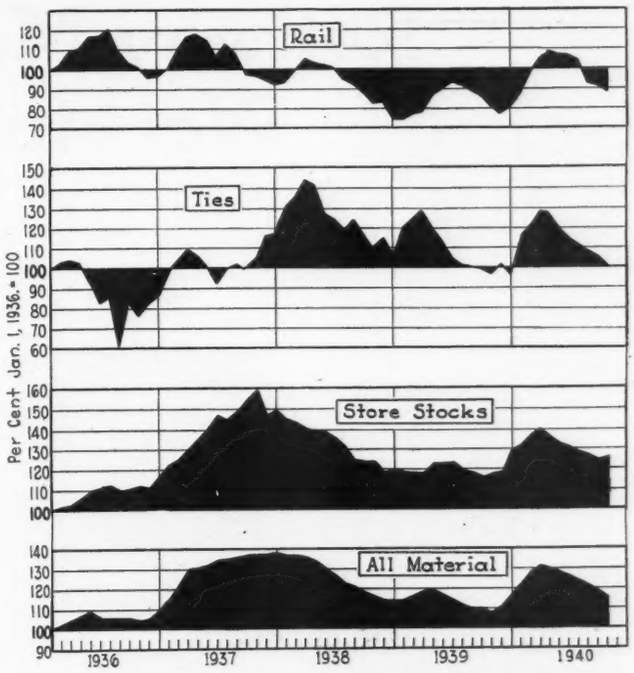
Trend of New Rail and Cross Ties Received Monthly by Class I Railroads

The railroads had $10,100,000, or 40 per cent, more in unapplied rail on May 1 than on January 1. They had $17,136,000 more in ties on April 1 than on November 1, 1939, and had $37,500,000 more in stores stock. Since that time stock piles have been substantially reduced, the Class I inventory on November 1, 1940, showing $7,833,000 decline in rail from the peak of 1940, $13,538,000 decline in ties and $11,366,000 decline in store stocks. This means that railroads had less materials in stock on November 1 than in the spring and also that the railroads used approximately $31,150,000 more rail, ties and store stock since last April than they purchased. Material consumption during the first 10 months of 1940 was larger by $60,600,000 or 15 per cent than in the corresponding period of 1939.

Materials in Stock Oct. 31, 1940

Road	Rail—New and S. H. Oct. 31, 1940	Rail—New and S. H. Per Mile	Crossties Oct. 31, 1940	Crossties Per Mile	Other Material Less Fuel Oct. 31, 1940	Other Material Less Fuel Increase Per Cent
A. C. & Y.	$ 3,172	$18	$ 39,534	$23	$ 78,830	– 2
Alton	81,816	86	63,200	66	551,755	23
Alton & Sou	24,918	..	7,054	..	62,974	34
Ann Arbor	13,067	44	8,891	31	171,071	2
A. T. & S. F.	1,989,325	147	7,275,149	540	11,273,774	21
A. C. L.	364,356	72	358,367	70	2,238,097	20
B. & O.	407,815	64	908,078	141	7,122,349	39
Bang. & Aroos.	99,234	164	97,680	162	680,694	15
Bost. & Me.	245,628	128	651,519	340	2,029,272	4
Burl.-R. I.	2,771	11	14,603	58	34,279	– 3
Cambria & Ind.	6,427	170	8,366	220	35,767	– 4
C. of Ga.	146,851	79	327,997	176	650,793	16
C. of N. J.	20,823	29	153,632	210	1,297,398	27
C. Vt.	89,986	212	112,161	266	340,785	27
Char. & W. C.	6,471	..	39,846	..	132,235	24
C. & O.	.....	..	.....	..	5,270,648#	47
C. & E. I.	89,755	97	151,733	163	561,546	13
C. & I. M.	39,331	300	11,290	86	261,982	14
C. & N. W.	681,489	..	2,244,063	..	4,209,657	..
C. B. & Q.	1,037,992	117	2,743,921	307	3,978,880	– 5
C. G. W.	7,440	5	4,561	3	519,717	20
C. R. L. & P.	649,168	83	1,307,963	165	5,011,992	3
C. St. P. M. & O.	179,512	..	378,284	..	645,107	..
Colo. & Sou.	58,693	75	58,388	75	154,042	–50
Col. & Gr.	4,418	26	1,875	11	113,022	– 7
D. & H.	169,691	200	380,456	450	1,480,087	5
D. L. & W.	107,739	107	112,166	112	1,210,179	9
Det. & Mack.	27,386	113	16,073	67	133,993	– 3
D. & T. S. L.	6,840	136	13,747	100	75,080	3
D. T. & I.	44,642	95	104,432	220	362,022	47
D. M. & I. R.	297,540	500	252,772	465	666,626	22
D. S. S. & A.	8,330	..	38,018	..	138,921	..
E. J. & E.	52,344	134	85,627	220	748,728	– 3
Erie	271,218	120	791,983	350	2,306,874	15
F. E. C.	275,992	400	90,034	132	1,271,424	11
Ft. W. & D. C.	29,380	33	36,058	40	405,096	11
G. N.	1,046,212	128	639,838	79	6,199,669	10
I. C.	36,192	65	351,167	54	5,071,478	15
Ill. Term.	56,972	119	68,025	142	310,510	7
K. C. Term.	2,389	..	33,174	..	134,810	13
L. & N. E.	60,210	318	27,616	145	220,360	41
L. S. & I.	49,895	320	21,647	139	220,907	..
Leh. Val.	161,860	126	261,057	205	1,602,978	–13
La. & Ark.	137,604	159	102,926	117	578,158	12
L. & N.	236,149	49	2,204,173	45	5,384,722	24
Me. Cent.	119,486	120	113,025	114	740,103	– 8
Soo	175,964	41	311,179	73	1,304,693	10
Miss. Cent.	3,433	23	8,675	57	45,494	10
Mo. & Ark.	2,014	6	2,282	6	44,903	–14
M-K-T	63,739	20	324,807	99	1,432,572	– 2
Montour	6,377	120	180	3	151,185	2
N. C. & St. L.	81,565	74	460,310	415	1,387,949	39
N. Y. C. Sys.	2,155,863	191	3,562,753	300	23,899,431	9
N. Y. C. & St. L.	.....	..	.....	..	2,299,534#	52
N. Y. N. H. & H.	551,236	296	814,932	440	3,441,048	10
N. Y. O. & W.	22,663	40	4,985	10	377,942	– 5
N. P.	114,910	17	1,115,940	166	5,300,818	– 7
N. W. P.	11,533	33	35,543	100	86,855	15
Penna.-L. I.	2,558,041	240	4,159,636	390	31,376,192	30
Pa.-R. S. S.	37,119	90	22,413	55	157,145	88
P. & P. U.	3,004	..	4,877	..	86,679	– 4
Pere Mar.	.....	..	.....	..	2,594,581#	38
Pitt. & Shaw.	5,844	58	32,128	320	71,729	0
P. S. & Nor.	7,351	38	15,707	83	52,990	1
Reading	334,518	230	378,569	260	3,146,037	9
R. F. & P.	.....	..	.....	..	832,851	20
St. L.-S. F.	237,375	48	805,854	165	2,709,428	– 1
St. L. S. W.	178,409	107	258,297	156	1,311,946	30
S. A. L.	333,518	..	479,534	..	3,445,387	16
Sou.	356,377	46	1,394,747	180	5,422,081	13
S. P.-Pac. Sys.	801,649	93	1,654,579	193	7,014,446	14
S. P. & S.	183,030	194	36,229	38	600,311	9
Tenn. Cent.	.....	..	10,802	38	220,201	30
Term. of St. L.	7,955	..	11,363	..	294,447	4
T. & N. O.	303,253	69	613,091	139	2,063,740	6
T. & P.	563,311	300	288,770	153	2,460,299	10
U. P.	4,028,297	445	2,439,653	246	15,007,798	0
Utah	33,608	300	57,567	515	166,875	2
Va.	429,190	670	391,563	610	2,729,661	90
Wabash	284,162	118	245,500	102	1,901,858	40
West. Md.	41,578	49	284,505	33	1,026,002	7
West. Pac.	212,000	..	219,900	..	1,247,000	–15
W. & L. E.	173,127	340	142,236	280	890,349	23
W. F. & Sou.	2,882	..	2,736	..	20,298	– 4

Materials and Fuel.



Comparative Trends of Materials in Stock

A Billion Dollars of Deferred Buying

With the stimulus which the government program for national defense has given to discussions about the physical conditions of the railroads, the relation between railway purchasing and railway revenues has again been taken as an indicator of the deficiency, if any, which exists in railway buying. This is on the assumption, first, that purchases are indispensable to railway operation, second, that railway purchases are principally paid for out of railway revenues, and third that, while many factors determine the material requirements of the railroads, not the least important of which is traffic, the upkeep of established railroads requires expenditures bearing a relation to operating revenues which, while differ-

(*Continued on page 77*)

Materials in Stock—Class I Railroads

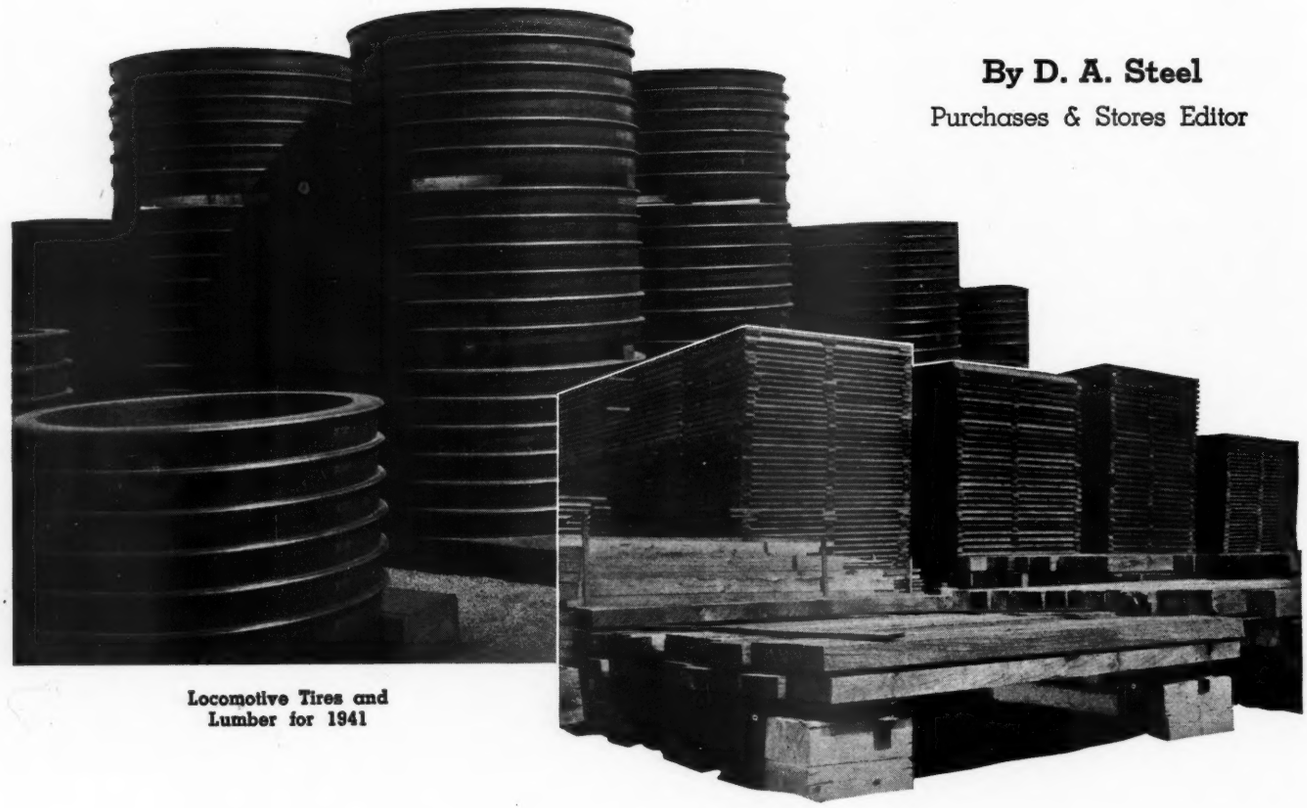
		Fuel (000)	Rail New and S.H. (000)	Cross ties (000)	Stores Stock (000)	Scrap (000)	Total (000)
				Year 1939			
Jan.	1	$22,660	$24,733	$59,491	$199,477	$11,200	$317,561
Feb.	1	25,594	24,691	61,796	196,330	10,393	318,804
Mar.	1	27,100	26,229	63,346	196,669	10,239	323,583
Apr.	1	29,445	27,695	65,246	197,383	10,686	330,455
May	1	24,101	28,459	60,749	203,806	11,217	328,332
June	1	21,048	29,345	57,067	205,169	11,548	324,177
July	1	18,732	30,520	52,809	205,027	11,761	318,849
Aug.	1	20,175	30,026	52,158	197,960	12,023	312,342
Sept.	1	21,165	29,137	51,375	194,802	12,384	308,863
Oct.	1	21,512	28,274	49,592	193,025	12,235	304,638
Nov.	1	20,800	26,642	47,330	197,378	11,722	303,872
Dec.	1	23,866	25,972	51,309	198,564	11,021	310,732
				Year 1940			
Jan.	1	$21,778	$25,552	$51,359	$216,996	$11,551	$327,236
Feb.	1	22,454	28,213	58,187	222,127	11,862	342,843
Mar.	1	23,190	31,546	60,615	230,045	11,576	356,972
Apr.	1	21,016	34,388	64,466	234,899	11,509	366,278
May	1	21,343	35,826	63,945	234,866	11,551	367,531
June	1	22,419	34,818	60,070	231,308	11,275	359,890
July	1	22,310	35,138	57,452	225,066	11,371	351,337
Aug.	1	24,065	34,134	55,988	222,001	11,326	347,514
Sept.	1	25,513	31,927	54,531	217,948	11,041	340,960
Oct.	1*	25,561	30,156	54,069	216,538	11,088	337,412
Nov.	1*	23,060	27,993	50,928	223,533	10,244	335,758

* Subject to revision.

Railway Material Costs Working Higher

Measures to control prices facing test as war business strains industrial capacity—First nationalized coal prices

By D. A. Steel
Purchases & Stores Editor



Locomotive Tires and Lumber for 1941

LAST year the railroads were able to obtain practically all of their requirements of materials and supplies, except lumber, without confusion and without appreciable change in prices from 1939, despite a war boom which has engulfed this country industrially. This is in contrast with the year immediately preceding the last World War when commodity prices advanced precipitously. Costs are rising, however, and each new development in the business of preparing for national defense is putting a greater strain on the forces which have been applied in the last six months to keep commodity prices from getting out of hand.

Average railway coal costs were unchanged most of last year but on October 1, 1940, the government applied minimum prices to bituminous coal under the Bituminous Coal Act of 1937, the effect of which will be to increase railway fuel costs by approximately $5,000,000 annually. Last fall the government released orders for over a billion board feet of dimension lumber for army camps and while most railroads were able to avoid the full effect of these orders on prices, their lumber costs were raised 15 per cent over the all-year average of 1939 and are now 7 to 25 per cent above the levels at this time a year ago. Tie costs averaged from two to five per cent above the all-year average in 1939. Rail prices were unchanged and this was also the case with most materials of iron and steel purchased in quantities, while the all-year cost of all other railway materials was increased about three per cent, principally because of proportionately higher increases in the cost of non-ferrous metals The combined effect of last year's developments was to raise this paper's weighted average material and fuel prices two per cent over the all-year average in 1939 and to make present prices two per cent higher than at this time one year ago. Iron and steel scrap, which railways sell, averaged 16 per cent over 1939.

Coal costs for the 12 months of 1940 were about 21 per cent over the all year average cost in 1933 and 5 per cent under 1929; fuel oil was 42 per cent over 1933 and 4 per cent under 1929 and gasoline to railroads was 15 per cent over 1933 and 25 per cent under 1929. Tie prices averaged about 15 per cent over 1933 and 7 per cent under 1929 and lumber averaged 52 per cent above 1933 and 10 per cent over 1929. Iron and steel costs averaged 10 per cent over 1933 and 3 per cent under 1929 while the all-year average for all materials averaged 19 per cent over 1933 and 4 per cent under 1929, with scrap iron and steel averaging 116 per cent over 1933 and 9 per cent over 1929.

This paper's weighted average cost of railway ma-

terials had an index value of 179 for the year 1940 as compared with 100 in 1914, 132 in 1916, 177 in 1917, when this country entered the last World War, 236 in 1920 and 179 in 1922 after the great deflation. The index of 180 for material last year compares with an index of 135 for railway freight revenue per ton mile, computed on the same basis and an index of 271 for railway labor costs equated to an hourly basis.

Relative Costs of Railway Material

	1940 to 1939 12 Mos. Index	1940 to 1933 12 Mos. Index	1940 to 1929 12 Mos. Index	Oct. 1940 to Oct. 1939 Index
Coal*	100	121	95	103
Fuel oil	100	142	96	100
Gasoline	102	115	75	100
Diesel fuel	103	—	—	101
Total fuel	100	124	93	100
Cross ties	109	115	93	109
Sw. & Br. ties	103	140	105	103
Lumber	116	152	110	114
Forest products	111	129	99	110
Rail	100	103	93	100
Iron and steel	101	110	97	101
Miscellaneous	103	119	90	101
Materials	103	115	96	103
Materials and fuel	102	119	96	102
Scrap Iron and Steel	116	216	109	119

*Excluding Freight

Deliveries and Prospects

Only the prices of lumber, castings, boiler tubes and boiler lagging and the prospective prices of coal seemed to have been singled out for criticism by the railroads last year. Less variation was evident between quotations of different dealers for the same commodity and some roads reported that competition for railroad business has definitely decreased. Beyond prices, the chief concern of the railroads in their purchasing centers around the delays met in obtaining materials. Deliveries are becoming less certain and some orders are requiring 60 days or more to fill. So far no dissatisfaction has been heard over the quality of material furnished.

All roads expect higher fuel prices this year. Base prices of iron and steel have been reaffirmed for the first quarter of 1940 but the most part only on materials which can be delivered in the first quarter. The feeling prevails that lumber prices will be sustained until the strikes in the lumber camps are settled and orders for army lumber have been filled. Higher prices are being offered by some railroads for ties and the up trend of prices is definitely spreading to car and locomotive specialties and machinery. A collapse of the war boom would change this trend.

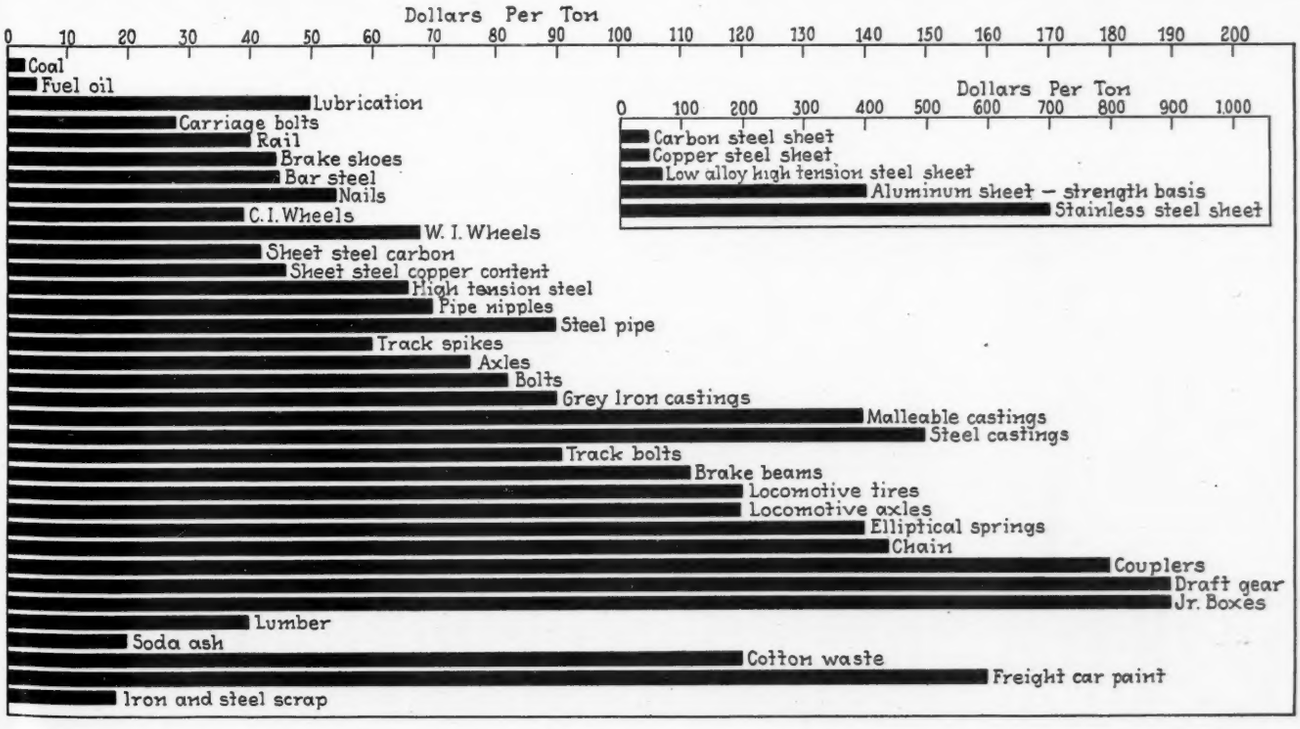
Cost of Coal for Locomotives—Class I Railroads*

Dollars per Net Ton

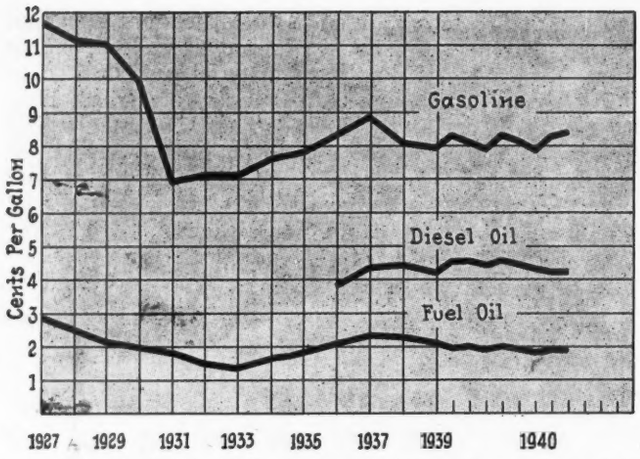
	United States		Eastern		Pocahontas		Southern		Western	
	A	B	A	B	A	B	A	B	A	B
1924	...	3.03	...	3.11	...	2.13	...	2.78	...	3.22
1925	...	2.72	...	2.75	...	1.78	...	2.62	...	3.02
1926	...	2.63	...	2.67	...	1.82	...	2.31	...	2.94
1927	2.21	2.66	2.09	2.70	1.68	1.76	1.85	2.26	2.73	3.00
1928	2.12	2.53	1.95	2.55	1.61	1.69	1.81	2.19	2.66	2.82
1929	2.01	2.40	1.88	2.45	1.60	1.69	1.72	2.10	2.47	2.61
1930	1.95	2.34	1.83	2.39	1.60	1.68	1.67	2.06	2.39	2.53
1931	1.83	2.21	1.67	2.22	1.57	1.66	1.56	1.95	2.32	2.45
1932	1.66	2.05	1.46	2.04	1.49	1.58	1.41	1.79	2.17	2.31
1933	1.58	1.96	1.38	1.95	1.43	1.51	1.38	1.75	2.06	2.17
1934	1.83	2.20	1.75	2.33	1.69	1.77	1.64	2.00	2.10	2.19
1935	1.89	2.27	1.82	2.40	1.76	1.85	1.75	2.12	2.11	2.21
1936	1.79	2.34	1.78	2.48	1.75	1.93	1.74	2.21	1.83	2.28
1937	1.89	2.43	1.90	2.55	1.90	2.09	1.85	2.31	1.89	2.36
1938	1.92	2.51	1.94	2.68	1.97	2.19	1.90	2.41	1.89	2.37
1939	1.91	2.50	1.94	2.68	1.98	2.18	1.89	2.40	1.86	2.32
1940†	1.88	2.45	1.89	2.60	1.95	2.17	1.88	2.37	1.83	2.30

*I. C. C. A equals average mine price. B equals cost of coal consumed including freight and handling costs.
†9 months.

Disregarding the effect on unit values of purchasing all materials on a ton basis and simply expressing unit prices in dollars per ton, the average cost of coal at $1.90 per ton at the mine last year compares with $5.30 for



Comparisons between the Approximate Unit Costs of Representative Railway Materials, expressed in Dollars per Ton



Comparative Trends of Locomotive Fuel Oils—Class I Railways

fuel oil, $40 for rail, $50 for cast iron pipe, $60 for track spikes, $65 for cast iron wheels, and $90 for wrought wheels, $90 for gray iron castings, $140 for malleable castings, and $150 for steel castings of comparable weights and quantities, $170 for couplers, $180 for draft gear, $240 for journal bearings, $150 for paint, and $35 to $50 for lumber.

Coal and the Law

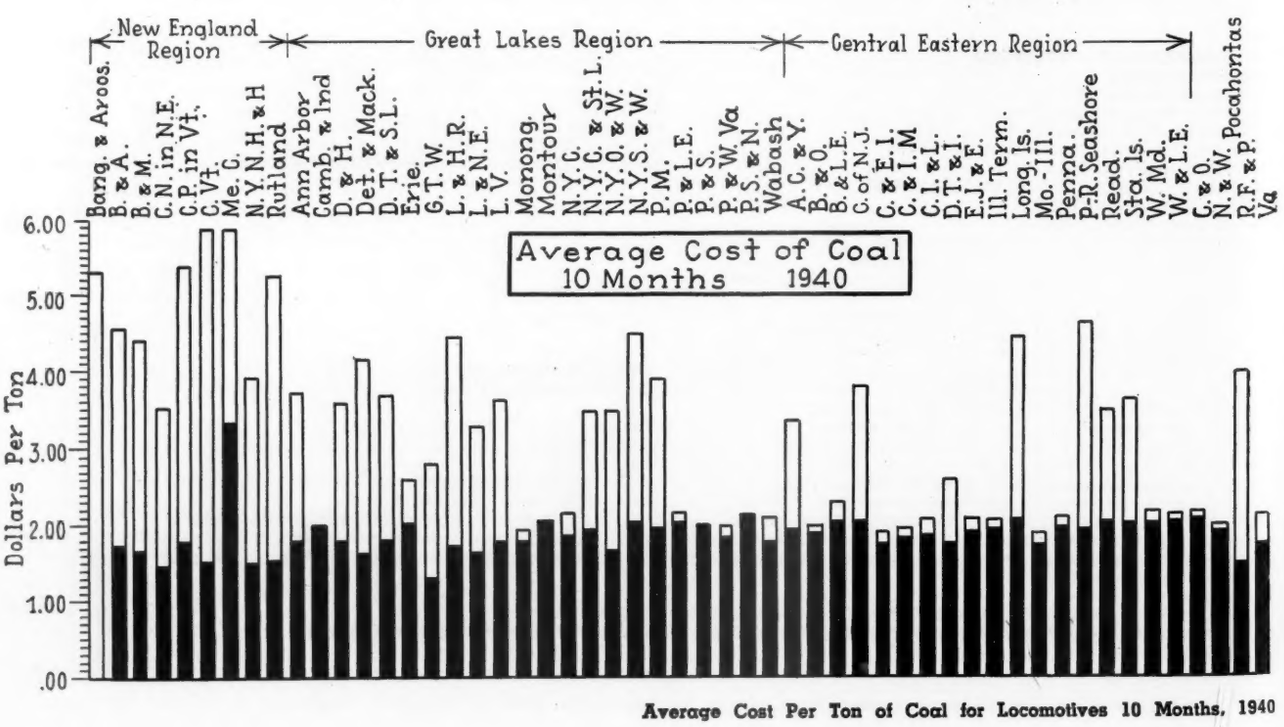
Although coal is about the least expensive commodity railroads buy, aggregate expenditures for it are large because the railroads use so much of it. Its cost to manufacturers, moreover, is a factor in the prices manufacturers charge railroads. Contrasted with 1939 when coal mines were almost completely shut down for six weeks because of strikes, operations suffered no arbitrary interruptions last year and production was at a heavier rate all year than in 1939 except during October when coal which was accumulated in anticipation of the higher prices was being absorbed. Production up to December 14, (468,428,000 tons) was 13.0 per cent over the corresponding tonnage in 1939 and was within 17 per cent with the corresponding production in 1929 before so much coal was replaced by other fuels. The corresponding increase in fuel oil production in 1940 was only 7.6 per cent.

Transcending in importance all other developments in last year's commodity markets from some viewpoints was the institution of minimum prices prescribed by law to govern the sale of bituminous coal. The prices, which became effective October 1, had been long awaited and marked the culmination of seven years of effort (not without opposition) by the U. S. Government and coal producers to improve the bituminous coal industry by preventing cut-throat competition in the sale of coal and raising and maintaining prices at levels commensurate with the average cost of production.

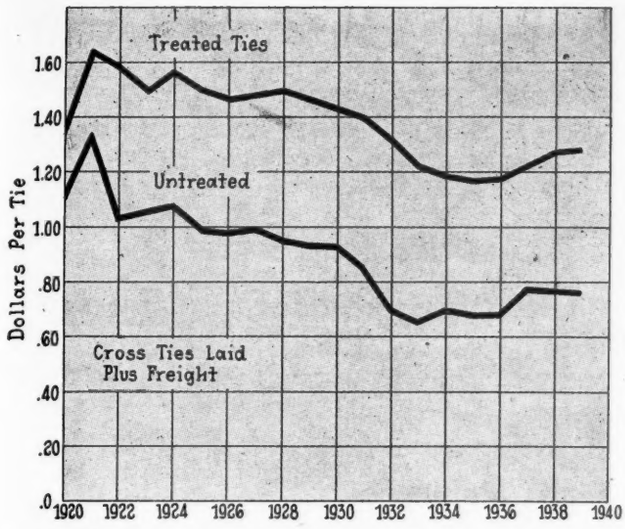
The first attempt (bituminous coal code of 1933) failed when the N. R. A. was declared unconstitutional. Then came the bituminous coal act of 1935, popularly known as the Guffey Bill, which was declared unconstitutional because of its labor provisions. Again in March, 1938, minimum prices and marketing rules established by a National Bituminous Coal Commission created by the Act of 1937 were revoked in the face of litigation in which railroads participated. Another set-back was met in July, 1939, when the coal commission was abolished under the Re-organization Act and its functions transferred to the Coal division of the Interior department. Hearings were then resumed and at this time last year the administration's rules and prices were expected momentarily but the examiner's reports were not made public until April and the remainder of the year up to October was taken up with controversies over the scope and

Weighted Average Cost of Railway Materials

1914	100	1923	194	1932	151
1915	107	1924	189	1933	149
1916	137	1925	184	1934	165
1917	177	1926	183	1935	167
1918	212	1927	179	1936	173
1919	216	1928	178	1937	186
1920	236	1929	180	1938	180
1921	187	1930	173	1939	175
1922	179	1931	162	1940	179



Average Cost Per Ton of Coal for Locomotives 10 Months, 1940



Year-to-Year Average Costs of Treated and Untreated Cross Ties Laid in Replacement—Class I Railways

application of the rules and with litigation before the Supreme Court where the law and procedure as now administered was upheld.

The administration has determined the weighted average costs of producing coal in each of the 10 coal districts and prescribed minimum prices at which each size and grade of coal in each district may be sold. The law prescribes approximately 500,000 different prices. Nonmembers are subject to 19½ per cent tax on the sale of their coal. Members are subject to triple penalties for violations. Distributors who purchase coal outright and resell it wholesale to railroads and other large consumers, including agricultural co-operative associations, are distinguished from sales agents and maximum discounts from minimum prices which producers are permitted to make to distributors and agents, ranging from 5 cents on railroad coal up to 50 cents for commercial coal, are prescribed in each district. For the most part all applications made by railroads and others to relieve captive mines, intrastate operations and low grade coal from the application of the act have failed.

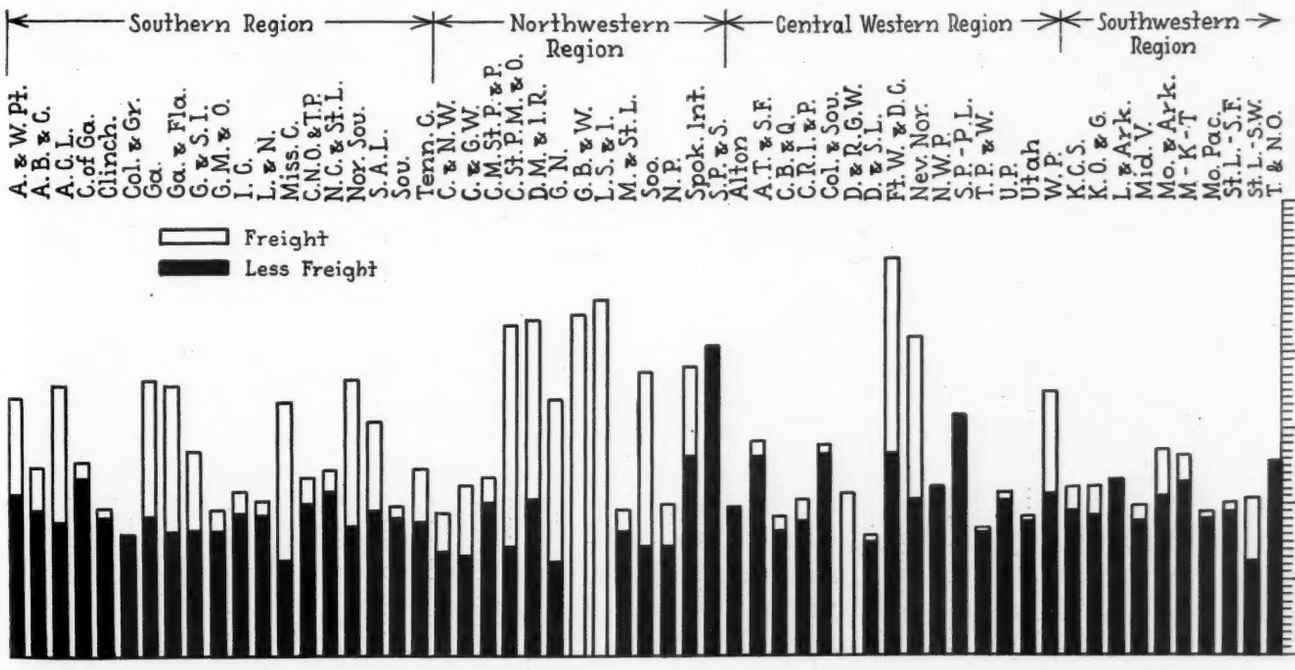
While the immediate effect of the minimum prices will be to increase railroad coal costs about 7 or 8 cents per ton or approximately $5,000,000 per year in the aggregate, this is about $15,000,000 less than was anticipated before revisions were obtained by the railroads reclassifying railroad coal and allocating the increased cost more largely to commercial coal. Wholesale costs of commercial coal were 9.5 per cent higher in August, 1940, than in August, 1939. Locomotive coal is less affected than coal for power plants which is no longer selling at prices below $1 per ton and distress coal is largely eliminated. The law expires on April 25 and opposition, especially among coal consumers, has been organized to prevent its reenactment. Wage agreements with miners expire March 31. The enforceability of the Coal Act is in question. However, most producers are resigned to the law and its reenactment is expected, even though

Average Cost of Cross Ties Laid in Replacement—Class I Railroads

Dollars per Tie

	Untreated				Treated			
	United States	Eastern Dist.	Southern Dist.	Western Dist.	United States	Eastern Dist.	Southern Dist.	Western Dist.
1920	1.20	1.36	1.29	.93	1.35	1.48	1.34	1.26
1921	1.34	1.76	1.21	1.08	1.64	2.10	1.55	1.39
1922	1.03	1.46	.87	.88	1.58	1.99	1.42	1.33
1923	1.05	1.38	1.02	.90	1.49	1.87	1.23	1.26
1924	1.07	1.58	1.07	.91	1.56	1.91	1.44	1.35
1925	.99	1.25	1.02	.85	1.49	1.92	1.39	1.29
1926	.98	1.23	1.04	.81	1.46	1.83	1.37	1.25
1927	.99	1.26	1.04	.82	1.48	1.89	1.40	1.28
1928	.95	1.21	.97	.83	1.49	1.89	1.44	1.29
1929	.93	1.13	.97	.81	1.46	1.88	1.35	1.27
1930	.92	1.12	.95	.82	1.43	1.81	1.34	1.26
1931	.84	1.00	.87	.77	1.39	1.76	1.30	1.25
1932	.70	.92	.70	.66	1.32	1.66	1.24	1.18
1933	.65	1.03	.63	.57	1.22	1.56	1.09	1.09
1934	.69	.77	.77	.57	1.18	1.50	1.07	1.06
1935	.68	.77	.72	.60	1.17	1.45	1.06	1.07
1936	.68	.72	.76	.59	1.18	1.42	1.10	1.08
1937	.77	.80	.87	.67	1.22	1.50	1.17	1.10
1938	.76	.75	.89	.65	1.27	1.54	1.26	1.16
1939	.75	.77	.86	.66	1.28	1.52	1.29	1.17
1940*	.80	...	...	...	1.33	...	...	...

* Subject to revision.
Source I. C. C. Labor excluded.



With and Without Freight. Mine Costs Missing Where Not Shown

Average Unit Costs of Railroad Materials—1927-1940*

Description	Unit	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940 First quarter	1940 Mid-year	1940 Last quarter	1940 Average	Per cent of 1939	Per cent of 1933	Oct.'40 % of Oct.'39
TRACK MATERIALS																					
Rail	N.t.	$43.00	$43.00	$43.00	$43.00	$43.00	$42.00	$38.79	$36.37	$36.37	$36.375	$41.33	$41.66	$40.00	$40.00	$40.00	$40.00	$40.00	100	103	100
Tie plates	Steel N.t.	45.98	42.43	42.10	41.22	38.88	36.40	36.64	39.56	38.73	39.91	44.93	45.45	43.70	43.74	43.74	43.74	43.74	100	120	100
Track bolts	Heat-treated Cwt.	4.00	3.83	3.75	3.94	3.74	3.42	3.52	3.71	3.71	3.87	4.40	4.50	4.31	4.34	4.34	4.34	4.34	101	123	100
Track spikes	High-carbon steel Cwt.	2.80	2.76	2.71	2.68	2.57	2.45	2.32	2.46	2.46	2.68	3.09	3.54	3.03	3.02	3.02	3.02	3.02	100	130	100
Track shovels	No. 2 carbon steel Doz.	12.95	13.82	11.28	10.02	9.98	10.93	11.53	13.20	13.26	12.70	13.02	13.70	13.51	13.66	13.65	13.60	13.63	101	108	100
Wire fence	Woven Rod	.467	.488	.426	.428	.396	.383	.370	.402	.416	.403	.502	.516	.490	.502	.504	.504	.503	102	136	107
Steel, structural	Angles Cwt.	1.98	1.98	2.35	1.98	1.84	1.73	1.75	1.93	1.96	2.19	2.48	2.48	2.37	2.36	2.37	2.37	2.37	100	135	100
Pipe, cast-iron	12 in. Class B N.t.	41.13	41.13	29.41	40.37	35.58	33.94	37.91	40.80	40.60	42.25	42.99	50.58	48.57	50.43	51.00	51.00	50.81	104	134	103
Pipe, culvert	24 in. corr Ft.	...	...	...	...	...	1.95	1.74	2.02	2.16	2.19	2.54	2.59	2.34	2.42	2.40	2.38	2.40	102	138	102
Ballast	Crushed rock C.y.	...	...	...	...	...	...	...	...	...	...	1.05	.88	.89	.91	.91	.90	.91	102	...	101
LOCOMOTIVE AND CAR MATERIALS																					
Bolts, with nuts	¾x6, machine 100	5.13	5.02	4.87	4.81	4.20	4.04	4.70	4.59	4.08	3.97	4.93	4.75	4.36	4.54	4.40	4.60	4.52	104	97	100
Boiler tubes	2 in. No. 11, steel Ft.	.172	.172	.174	.154	.152	.152	.156	.161	.161	.158	.166	.165	.154	.158	.158	.158	.158	102	101	104
Bar steel	Open-hearth Cwt.b.	2.13	2.58	2.17	1.85	1.80	1.72	1.73	1.84	2.01	2.09	2.49	2.47	2.27	2.23	2.24	2.24	2.24	99	129	100
Steel	High-speed tool Lt.b.	.59	.58	.57	.66	.52	.49	.52	.60	.61	.64	.78	.80	.77	.79	.79	.79	.79	102	152	103
Steel	Boiler Cwt.b.	2.01	2.00	2.33	2.01	1.86	1.73	1.82	2.10	2.05	2.12	2.53	2.40	2.25	2.26	2.26	2.26	2.26	100	124	100
Steel	Spring Cwt.b.	2.74	2.63	2.84	2.62	2.42	2.18	2.23	2.31	2.36	2.54	3.03	2.94	2.81	2.87	2.88	2.88	2.88	102	129	103
Steel	24-gage black Cwt.	3.20	2.99	3.25	2.90	2.65	2.69	2.68	2.72	2.81	2.82	3.28	3.13	2.80	2.92	2.90	2.92	2.91	104	108	104
Steel	No. 1 G.t.	20.50	20.50	17.35	16.61	15.37	14.85	15.74	18.30	18.59	19.47	22.13	20.97	19.85	20.42	20.75	21.75	20.97	106	132	105
Pig iron	Carbon steel Lb.b.	...	...	...	...	...	...	...	...	...	...	...	...	...	.081	.081	.081	.081	...	...	...
Crank pins	Loco. driving N.t.	61.70	61.70	59.54	60.00	56.28	54.28	54.50	56.30	56.65	56.65	61.36	62.70	63.90	65.18	65.55	67.00	65.91	103	121	103
Brake shoes	Freight car N.t.	36.93	39.98	37.55	35.42	35.12	32.70	33.40	35.00	36.00	37.77	48.27	48.50	48.50	50.05	50.25	51.45	50.58	104	151	103
Brake shoes	Loco. driving N.t.	3.86	3.97	4.12	4.12	4.00	3.82	3.82	3.90	3.87	4.14	4.25	4.15	4.10	4.29	4.28	4.15	4.24	103	110	101
Castings, Gray iron	Green sand Cwt.	9.13	8.50	8.68	8.27	7.68	7.59	7.42	8.99	8.29	8.42	10.38	10.50	10.60	11.17	11.30	11.46	11.31	107	153	106
Castings, malleable	7-15 lb. 25-100 Cwt.	8.64	7.97	8.32	8.46	7.73	7.37	7.25	8.52	8.49	8.52	11.91	12.50	12.10	12.51	12.21	12.28	12.33	101	170	102
Castings, steel	25-50 lb. under 50 Cwt.	41.20	40.20	40.20	41.20	39.20	38.13	37.20	40.20	40.20	42.43	51.70	51.50	51.00	50.87	50.87	50.87	50.87	100	136	100
Couplers, car	5x7x6½ AAR-E Pr.	...	...	...	...	...	...	1.35	1.40	1.40	1.40	1.50	1.24	1.27	1.30	1.30	1.30	1.30	102	97	102
Wheels, car, C. I.	33 in. exchange Cwt.	...	...	...	...	...	...	...	...	...	...	30.60	34.53	33.64	34.14	34.14	34.14	34.14	102	...	101
Wheels, car, steel	33 in. tender 800-lb. Ea.	...	...	...	...	...	...	4.56	4.90	5.06	5.26	5.94	5.80	5.83	5.73	5.73	5.73	5.73	98	125	99
Axles, loco	Driving, carbon Cwt.	5.16	5.21	4.84	4.29	4.75	4.55	2.53	2.89	2.98	3.09	3.61	3.54	3.41	3.45	3.45	3.45	3.45	101	136	100
Axles, car	5x9, rough turned Cwt.	2.94	2.94	2.94	2.88	2.88	2.75	5.55	5.67	5.97	5.83	6.21	6.20	6.12	6.08	6.08	6.08	6.08	100	109	100
Tires, frt. loco	33 in., rough bored Cwt.	6.11	6.11	5.84	6.22	6.03	5.86	.063	.063	.066	.062	.073	.074	.070	.063	.063	.060	.062	87	96	86
Pipe	1 in. black steel Ft.	.076	.069	.066	.067	.069	.063	2.66	2.67	2.69	2.71	2.72	2.72	2.51	2.60	2.57	2.66	2.61	104	116	107
Wire nails	Common Cwt.	2.58	2.62	2.62	2.29	2.07	2.18	2.23	2.62	2.83	2.28	2.71	2.72	2.51	2.60	2.57	2.66	2.61	104	116	107
Pig lead	Virgin Cwt.	7.04	6.43	6.95	5.64	4.42	3.53	4.17	4.04	4.44	4.87	6.34	5.12	5.30	5.45	5.21	5.33	5.33	100	127	93
Copper	Sheet, soft Lb.	.218	.23	.27	.259	.181	.180	.169	.180	.211	.212	.252	.249	.245	.243	.242	.247	.244	100	144	98
Journal bearings	AAR Lb.	.142	.141	.167	.149	.10	.07	.081	.093	.096	.106	.139	.114	.122	.133	.126	.130	.130	107	161	101
Wire, copper	No. 9 bare Lb.	.149	.167	.195	.163	.115	.100	.113	.138	.141	.142	.185	.163	.165	.173	.169	.168	.170	103	150	100
MISCELLANEOUS																					
Boiler lagging	1¼x6x36 mag Sq.ft.	.21	.22	.236	.160	.155	.156	.156	.157	.160	.154	.183	.182	.183	.179	.174	.179	.177	98	113	99
Fire brick	Soft M	41.74	43.08	41.73	41.85	39.29	34.70	37.20	44.58	45.26	45.64	50.42	49.75	49.20	46.74	46.74	46.74	46.74	95	125	95
Hose, air brake	Air brake, 1⅜x22 Ft.	.48	.46	.44	.45	.37	.33	.31	.39	.41	.40	.44	.38	.36	.35	.35	.33	.34	95	109	90
Leather	Belting, 6 in. double Ft.	1.22	1.35	1.39	1.39	1.23	1.27	1.17	1.32	1.31	1.32	1.30	1.26	1.24	1.25	1.25	1.25	1.25	100	107	101
Rope	¾ in. manila Lb.	.217	.199	.199	.189	.153	.142	.127	.142	.130	.167	.180	.168	.154	.175	.172	.162	.170	110	134	98
Cable	¾ in. 6x19 steel Ft.	.125	.119	.144	.14	.143	.132	.137	.155	.161	.161	.174	.174	.163	.157	.155	.155	.156	96	114	95
Rubber, red	⅛ in. sheet packing Lb.	.32	.28	.247	.25	.225	.176	.172	.177	.167	.131	.141	.137	.135	.16	.16	.16	.16	119	94	118
Oil	Switch lamp-tanks Gal.	.096	.09	.087	.117	.062	.061	.051	.053	.052	.055	.055	.059	.055	.057	.058	.058	.058	105	114	105
Oil	Car-tank lots Gal.	.180	.157	.157	.163	.138	.127	.134	.135	.132	.141	.132	.144	.147	.142	.142	.143	.142	97	106	96
Grease	Driving box Lb.	.160	.122	.125	.131	.122	.118	.109	.104	.103	.102	.101	.100	.099	.100	.100	.100	.100	101	92	101
Waste	Colored cotton Lb.	.098	.091	.086	.084	.076	.051	.057	.065	.057	.073	.079	.058	.060	.069	.066	.066	.067	111	118	110
Creosote oil	Tank lots Gal.	.157	.157	.145	.130	.115	.108	.093	.106	.116	.109	.123	.125	.130	.129	.129	.129	.129	100	138	99
Welding electrodes	3/16" Cwt.	...	...	...	...	...	...	...	...	...	...	...	...	...	6.28	6.00	6.00	6.09	...	...	...
Glass	24x24 dsa Box	5.23	5.10	5.76	5.84	4.80	4.71	5.18	4.59	5.03	4.81	5.60	5.25	5.06	4.78	4.78	4.84	4.80	96	93	96
Freight car paint	Mineral brown Gal.	...	...	...	...	...	...	...	...	...	...	...	...	...	.87	.88	.88	.88	...	...	...
Linseed oil	Boiled Lb.	.088	.093	.117	.120	.09	.068	.087	.095	.103	.104	.117	.10	.096	.104	.100	.087	.097	101	112	85
White lead	In oil-100 lb. keg Lb.	.11	.102	.104	.106	.107	.088	.08	.081	.085	.085	.100	.086	.091	.097	.097	.096	.097	106	121	100
Cement, Portland	In paper Bbl.	2.21	1.85	1.87	1.76	1.42	1.42	1.80	1.95	2.16	2.02	1.98	1.98	1.99	2.04	2.01	2.01	2.02	102	112	101
Roofing	Roll	...	...	...	...	...	...	...	...	...	...	...	...	...	1.44	1.44	1.46	1.44	...	...	...
Soda ash	Water softening Cwt.	1.33	1.40	1.46	1.56	1.55	1.30	1.21	1.31	1.32	1.30	1.20	1.17	1.20	1.21	1.21	1.21	1.21	100	100	100
Hydrated lime	Water softening N.t.	13.63	11.99	11.96	9.73	9.53	9.49	8.35	8.50	8.48	8.59	9.47	9.60	8.46	8.08	8.05	8.03	8.05	95	96	95
Oxygen	100 Cu.ft.	1.29	1.04	1.03	1.05	1.06	1.02	1.04	1.10	1.06	.94	.91	.90	.82	.86	.86	.86	.86	104	82	104
Incandescent lamps	100 W., 110 V. frosted Ea.	...	...	...	...	...	...	...	...	...	...	.161	.128	.116	.115	.109	.109	.111	96	...	96
Waybills	M	...	...	...	...	...	...	...	...	...	...	...	...	...	1.78	1.78	1.79	1.78	...	...	...
Lanterns, Hand	Clear globes Doz.	...	...	14.80	14.80	14.80	14.80	15.10	16.00	16.00	16.00	16.00	16.75	16.75	16.75	16.75	16.75	16.75	100	111	100
FOREST PRODUCTS																					
Car siding	1x6x9 B&B fir M.ft.	...	...	...	...	...	18.76	25.14	31.40	32.10	32.50	34.16	30.56	35.78	45.00	42.00	49.67	45.56	127	181	117
Car siding	1x6x9 B&B pine M.ft.	...	...	...	...	...	21.83	36.75	45.00	37.29	47.22	47.11	39.83	40.91	43.25	40.38	49.60	44.41	109	...	108
Car sheathing	2x6x18 B&B fir M.ft.	...	...	...	...	...	...	...	...	...	...	41.50	30.40	35.20	38.10	39.10	46.20	41.13	117	112	111
Car sheathing	2x6x18 B&B pine M.ft.	...	...	...	...	...	10.23	13.00	19.00	17.98	20.20	45.52	40.36	40.73	45.63	46.00	52.38	48.00	118	...	117
Car sills	6x6 com. rgh, fir M.ft.	...	...	...	...	...	12.52	15.70	23.50	21.15	20.69	23.96	20.80	20.37	22.75	20.00	28.38	23.71	117	182	118
Br. stringers	16"x32' or less, fir M.ft.	...	...	...	...	...	23.23	19.61	19.76	20.38	20.00	24.22	21.53	109	137	114					
Crossties	7x9x8'6", fir Ea.	.60	.60	.67	.80	.50	.50	.49	.53	.49	.53	.61	.53	.42	.51	.53	.53	.52	124	106	126
Crossties	7x9x8'6", pine Ea.	.67	.67	.67	.77	.65	.73	.64	.62	.57	.72	.77	.73	.75	.72	.73	.76	.73	98	114	100
Crossties	7x9x8'6", white oak Ea.	.98	.95	.93	.92	.83	.75	.69	.69	.67	.82	.96	.82	.84	.87	.87	.87	.87	104	127	100
RAILROAD SCRAP (SOLD)																					
No. 1 wrought	N.t.	11.16	11.39	11.96	8.68	7.20	4.20	6.65	7.96	9.07	12.20	13.20	9.90	12.70	13.48	14.09	15.63	14.40	114	200	112
No. 1 heavy melt	N.t.	11.63	11.34	12.82	10.62	7.33	5.34	7.32	8.55	9.29	12.32	14.44	11.70	13.83	14.61	15.75	17.44	15.93	115	218	113
Rails for re-rolling	N.t.	13.80	12.92	14.49	12.55	10.05	7.18	8.10	9.22	9.89	13.21	15.97	14.00	15.95	17.12	19.04	20.17	18.78	118	230	104

* Compiled from special reports made by railroads to the *Railway Age*.

there is less excuse for the price boosting provisions now than when the law was first enacted.

Fuel Oil Unchanged

Although the consumption of fuel oil for locomotives (47,214,000 barrels or 1,990,000,000 gal.,) in the first nine months of 1940 was about seven per cent more than the corresponding consumption by the railroads in 1939 there was no increase in average costs and contracts are being renewed on the same basis for this year's supply. This is chiefly because most fuel oil is purchased at a fixed percentage of the cost of crude petroleum and the fact that the demand for lighter fractions of crude has produced the heavier derivatives in sufficient volume for all railroad requirements, notwithstanding that the production of crude has been controlled in practically all states but Illinois and was only 8.3 per cent larger last year than in 1939. Illinois ranks third in the production of crude petroleum but this all is of lighter gravity than the crude from which railroad fuel oil is produced and the Illinois production has started to decline, with the result that Illinois oil is a less important factor in determining the supply and cost of railroad fuel oil than gasoline. Its effect appears to be that of increasing the supply of heavier oil available to the railroads in Oklahoma and Texas by increasing the supply of industrial oil. Less spot oil has been available than in previous years and the railways are relying much less on spot oil purchases for their supply than when the rationing of crude oil production was less extensive and less efficient than at present.

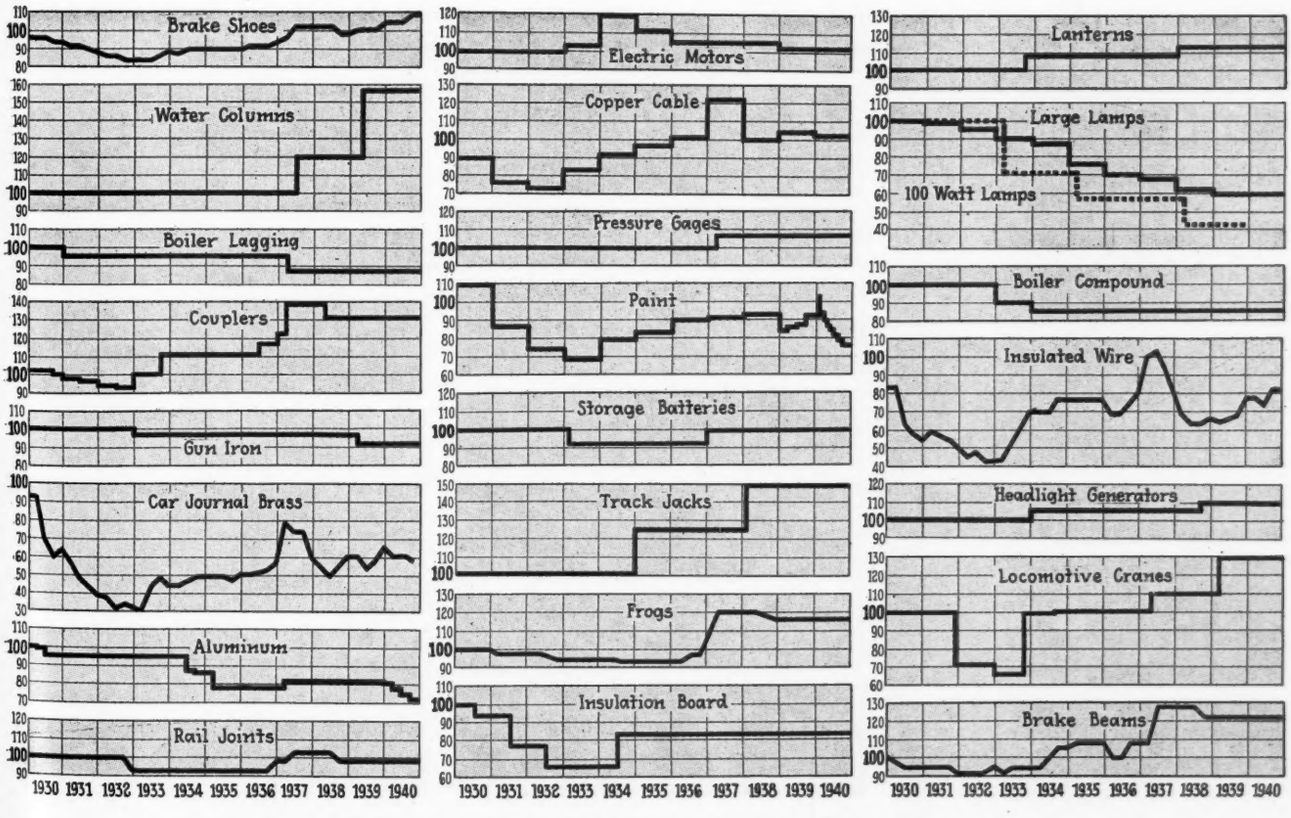
Information available at this time indicates a decline of one per cent in gasoline consumption by the railroads last year and a 66 per cent increase in Diesel oil, the consumption to October amounting to 25,540,000 gal. of gasoline and 57,865,000 gal. of Diesel oil. The latter includes oil for weed burning. Gasoline at 8.54 cents a gal., to the railroads in October was 3 per cent higher than in October, 1939, and the ten months average of 8.22 cents a gal., to railroads was 3 per cent over the

British Columbia Car Lumber—1940
Dollars Per M. F. B. M.

	Jan. 1940	June 1940	Oct. 1940	Oct. 1939
Timbers	$17.50	$19.00	$20.00	$18.00
1 x 4 x 5 Roofing	23.00	30.00	30.00	32.00
1 x 6 x 5 Roofing	30.00	30.00	28.00	30.00
1 x 4 x 8 L. Sheathing	26.00	32.00	34.00	32.00
1 x 4 x 9 L. Sheathing	32.00	32.00	36.00	38.00
1 x 6 x 8 Lining	27.00	27.00	28.00	31.00
2 x 6 x 9 R. G. Clear Fir	28.00	25.00	28.00	30.00
2 x 6 x 16 " " "	30.00	27.00	30.00	33.00
2 x 6 x 18 " " "	32.00	27.00	32.00	33.00
Average	27.40	27.70	29.60	30.80
Fir ties 7 x 9 x 8	13.00	13.00	13.00	13.00
Cedar ties 7 x 9 x 8	12.38	12.38	12.38	12.38

West Coast Lumber—Mill Prices

	Dec. 1, 1939	Dec. 1, 1940	Per Cent of 1939
Sills and gondola sides select com. 42' 3..	$24.00	$28.00	117
Framing, select com. 2" and less	19.00	23.00	121
Framing, select com. over 2"	19.00	23.00	121
Decking, select com. 2x6x9-10	22.00	26.00	118
Decking, select com. 2½x6x9-10	23.00	27.00	117
Shiplap, No. 1 com. fir	17.00	21.00	123
Dimension, No. 1. com.	17.00	19.00	112
Boards, No. 1. com. 1"	17.00	19.50	115
Bridge ties No. 1 com. SIS	15.50	18.00	120
Bridge caps, No. 1 com.	15.50	18.00	120
Plank, No. 1. com. 3" and 4"	15.00	17.50	116
Stringers, No. 1 com. 8x6 R.	18.00	20.50	114
Stringers, No. 1 com. 10x18 R.	18.50	21.00	113
Switch ties, fir	13.00	14.00	107
Switch ties, cedar	19.00	19.00	100
Cross ties, fir	12.00	12.50	104
Cross ties, cedar	17.00	17.00	100
Flooring, B. & B. V. G. fir 1x4	40.00	45.00	112
Crop siding, B. & B. K. D. fir 1x6	31.00	40.00	129
Sheathing, B. & B. K. D. fir 2x6-18'	45.00	55.00	122
Car siding, B. & B. fir 1"	32.00	45.00	140
Car roofing, B. & B. K. D. fir	24.00	34.00	141
Shingles, No. 2 cedar	2.00	2.00	100
Average			119



Comparative Trends in Costs of Railway Materials and Appliances. 1929 equals 100

* Compiled from special reports made by railroads to the Railway Age.
No. 1 heavy melt .....N.Y.
Rails for re-rolling.....N.Y.

average for the ten months of 1939. Diesel fuel at 4.22 cents a gal., to railroads in October was 3 per cent higher than a year ago. The prices of railroad gasoline differ widely on different railroads with differences in practice and the variety of conditions under which it is obtained, which range from tank lot buying to deliveries from local service stations.

A Boom in Steel

The trend of iron and steel prices last year was in sharp contrast to the demand for iron and steel, especially since June. Steel production declined to 60 per cent of mill capacity last March, following the heavy production of steel in the last quarter of 1939 and published prices of sheet steel, reinforcing sheets and a few other items declined $4 per ton in some cases. However, the boom of 1939 did not produce increased prices and the weakness which developed last spring was short lived. Large orders of steel for export, followed by the launching of this country's national defense program, started a steel boom and operations began to increase in May. Some plants were engaged up to their capacity in July. All mills were working 90 per cent or more of their capacity in August and the full capacity of all plants was engaged in November, with only a slight easing up since that time although the steel plants have a much larger ingot capacity now than in 1929 or previously. Pig iron production in October (4,450,000 tons) was an all-time peak, exports up to November (6,350,000 tons excluding scrap) were 2.6 times larger than the corresponding total in 1939 and both rationing and priority rules were employed to prevent serious dislocations, with exports for Britain enjoying the same priorities as production for domestic army and navy requirement.

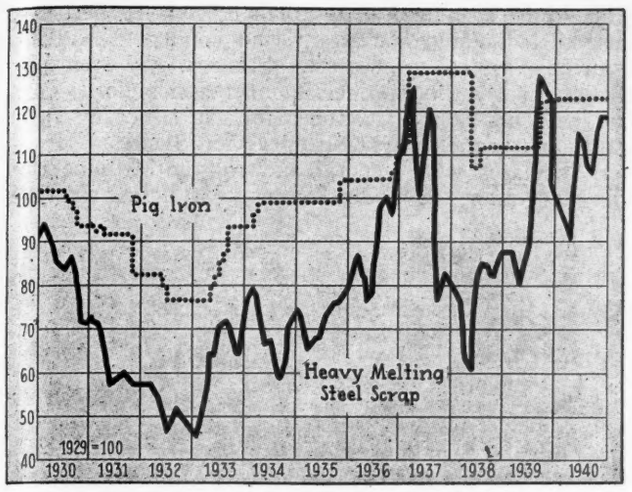
Average Cost of Fuel for Locomotives—Class I Railways 10 Months, 1940*

	Coal Per Ton—Less Freight[1]	Coal Per Ton—With Freight[2]	Fuel Oil Per Bbl.
Akron, Canton & Young	$1.94	$3.34	$3.05
Ala. Great Sou.	2.32	2.33	...
Alton	1.99	2.20	1.31
Ann Arbor	1.81	3.78	1.35
Atch., Top. & Santa Fe	2.62	2.83	.76
Atlanta & West Point	2.16	3.38	...
Atlanta, Birm. & Coast	1.96	2.49	...
Atlantic Coast Line	1.77	3.56	...
Baltimore & Ohio	1.90	1.98	1.53
Bangor & Aroostook	...	5.34	...
Bessemer & Lake Erie	2.07	2.27	1.65
Boston & Albany	1.74	4.63	...
Boston & Maine	1.68	4.43	1.84
Burl.-Rock Island	...	...	.82
Cambria & Indiana	2.05	...	...
Canadian National in N. E.	1.45	3.61	3.87
Canadian Pacific in Vt.	1.80	5.42	2.84
Central of Georgia	2.39	2.52	1.25
Central of New Jersey	2.04	3.81	1.91
Central Vermont	1.54	4.98	2.08
Char. & Western Carol.	1.90	3.47	...
Chesapeake & Ohio	2.10	2.17	1.41
Chicago & Eastern Illinois	1.75	1.88	1.10
Chicago & Ill. Mid.	1.83	1.93	2.14
Chicago & North Western	1.37	1.88	.60
Chicago, Burl. & Quincy	1.66	1.84	.61
Chicago Great Western	1.33	2.23	1.23
Chicago, Ind. & Louisville	1.85	2.03	1.67
Chicago, Mil., St. P. & Pac.	2.02	2.34	.97
Chicago, Rock Island & Pac.	1.79	2.09	.57
Chicago, St. P., Minn. & Om.	1.45	4.33	.64
Cin., New Orleans & Tex. Pac.	2.00	2.34	...
Clinchfield	1.81	1.91	1.79
Colorado & Southern	2.63	2.78	.55
Columbus & Greenville	1.56	2.56	...
Delaware & Hudson	1.80	3.61	1.46
Delaware, Lack. & Western	1.97	3.42	1.97
Denver & R. G. Western	2.08	2.14	2.25
Denver & Salt Lake	1.52	1.57	...
Detroit & Mackinac	1.61	4.21	...
Detroit & Toledo Shore	1.80	3.69	2.73
Detroit, Tol. & Ironton	1.77	2.67	1.66
Duluth, Missabe & Iron Range	2.08	4.43	2.52
Duluth, S. S. & Atlantic	...	4.78	1.28
Duluth, Minn. & Pacific	...	4.74	3.47
Elgin, Joliet & Eastern	1.91	2.03	1.86
Erie	2.02	2.62	1.58
Florida East Coast	...	...	1.11
Ft. Worth & Denver City	2.68	5.26	.54
Georgia	1.85	3.72	...
Georgia & Florida	1.64	3.62	2.02
Ga. Southern & Fla.	1.79	3.74	...
Grand Trunk Western	1.31	2.83	1.18
Great Northern	1.26	3.35	.81
Green Bay & Western	...	4.46	...
Gulf & Ship Island	1.64	3.72	1.93
Gulf Coast Lines	...	...	.79
Gulf, Mobile & Ohio	1.52	1.91	...
Illinois Central	1.86	2.18	1.33
Illinois Terminal	1.94	2.08	1.52
International-G. N.	...	...	.58
International of Maine	1.74	5.28	3.52
Kansas City Southern	1.92	2.23	.70
Kansas, Oklahoma & Gulf	1.86	2.25	1.57
Lake Sup. & Ishp.	...	4.76	...
Lehigh & Hudson River	1.72	4.47	...
Lehigh & New England	1.65	3.32	1.81
Lehigh Valley	1.79	3.66	1.96
Long Island	2.09	4.48	1.32
Louisiana & Arkansas	2.37	...	.58
Louisville & Nashville	1.88	2.03	1.56
Maine Central	3.35	4.90	1.86
Midland Valley	1.79	1.98	1.47
Minn. & St. Louis	1.72	1.92	1.10
Minn., St. P. & S. S. M.	1.36	3.75	1.39
Mississippi Central	1.25	3.32	...
Missouri & Arkansas	2.10	2.71	...
Missouri-Illinois	1.75	1.84	...
Missouri-Kan.-Tex.	$2.30	$2.66	$0.61
Missouri Pacific	1.80	1.87	.57
Monongahela	1.80	1.93	2.55
Montour	2.03	2.03	...
Nashville, Chat. & St. L.	2.16	2.37	.91
Nevada Northern	2.08	4.90	...
New Orleans & N. E.	2.16	3.58	1.58
New York Central	1.87	2.16	1.00
New York, Chicago & St. L.	1.95	3.49	1.61
New York Connecting	...	...	1.32
New York, N. H. & Hartford	1.53	3.98	1.31
New York, Ont. & Western	1.65	3.40	...
New York, Susq. & Western	2.05	4.52	...
Norfolk & Western	1.89	1.96	1.43
Norfolk Southern	1.70	3.63	...
Northern Pacific	1.44	2.01	.93
Northwestern Pacific	2.26	...	.82
Pennsylvania	1.99	2.12	1.74
Penn.-Reading Seashore Lines	1.95	4.69	1.29
Pere Marquette	1.97	3.94	1.45
Pittsburgh & Lake Erie	2.02	2.18	1.87
Pittsburg & Shawmut	2.13	2.21	3.71
Pittsburgh & West Va.	1.83	1.97	...
Pitts., Shawmut & Nor.	2.15	2.15	...
Reading	2.01	3.44	1.97
Richmond, Fred. & Potomac	1.51	4.02	...
Rutland	1.52	4.31	2.28
St. Louis-San Francisco	1.91	2.04	.60
St. Louis Southwestern	1.27	2.09	.62
Seaboard Air Line	1.91	3.08	1.27
Southern	1.84	1.93	1.60
Southern Pacific-Pac. Sys.	3.19	3.61	1.01
Spokane International	2.65	3.87	...
Spokane, Port. & Seattle	4.10	...	.90
Staten Isl. Rapid Transit	2.17	4.69	...
Tennessee Central	1.79	2.46	2.47
Texas & New Orleans	2.58	...	.75
Texas & Pacific	...	...	.68
Texas Mexican	...	...	1.00
Toledo, Peoria & Western	1.61	1.66	3.06
Union Pacific	2.07	2.19	1.15
Utah	1.78	1.83	2.07
Virginian	1.74	2.14	...
Wabash	1.77	2.10	1.41
Western Maryland	2.02	2.18	1.92
Western Pacific	2.17	3.47	.82
Wheeling & Lake Erie	2.04	2.14	1.59

CLASS I SWITCHING AND TERMINAL COMPANIES

Aliquippa & Southern	...	2.45	...
Alton & Southern	1.48	2.27	...
Baltimore & Ohio C. T.	1.90	3.62	...
Belt of Chicago	1.71	3.11	3.54
Brooklyn Eastern	...	...	1.22
Chicago & Western Indiana	1.58	3.20	1.80
Chicago River & Indiana	1.44	3.14	...
Cincinnati Union Terminal	1.42	3.28	...
Conemaugh & Black Lick	2.41	2.41	...
Detroit Terminal	1.84	3.91	...
Houston Belt & Terminal	...	...	.87
Indiana Harbor Belt	1.49	3.16	1.84
Indianapolis Union	1.71	2.95	1.83
Kansas City Terminal	1.80	3.67	.73
Kentucky & Indiana Terminal	1.58	2.94	...
Lake Terminal	1.49	3.31	...
Monongahela Connecting	3.78	3.81	...
New Orleans Terminal	2.13	4.50	...
Newburgh & South Shore	1.53	3.11	5.00
Northern Pac. Term. of Ore.	...	...	.93
Ogden Union	2.14	4.13	.73
Peoria & Pekin Union	2.03	2.33	3.06
Portland Terminal	3.47	4.85	2.10
St. Paul Union Depot	...	6.42	...
Terminal of St. Louis	1.66	2.61	2.55
Terminal of New Orleans	1.89	...	.77
Union of Penna.	2.50	2.57	2.10
Washington Terminal	2.05	4.66	...

* I. C. C. [1] Mine purchases. [2] Plus freight and handling charges.



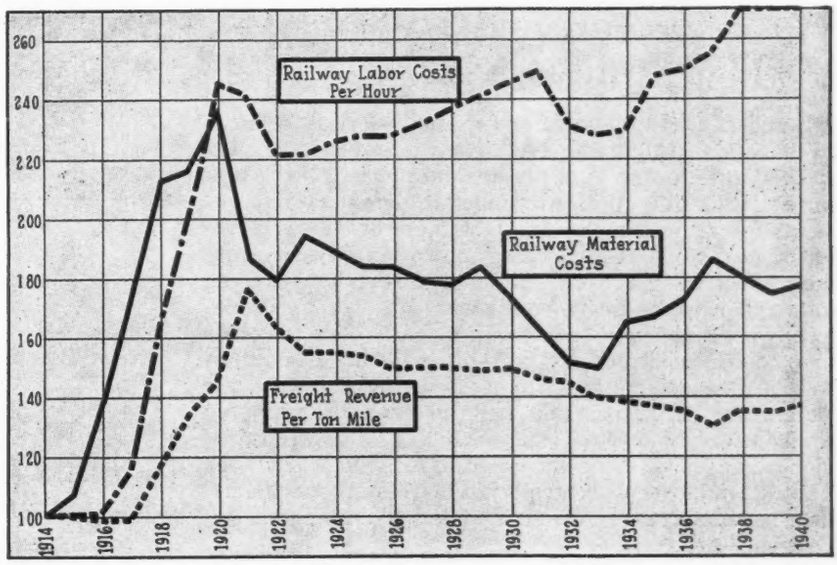
Month-to-Month Trends of Raw Material for Railroad Steel. 1929 equals 100

Basic prices were not increased except for export during this period, simply because the steel makers agreed not to increase them even though some increases were incurred in the cost of raw materials. Scrap producers promised not to withhold scrap tonnage from sale and the published prices of most iron and steel items have been reaffirmed for the first quarter of this year. However, conditions which have prevailed since last summer are tending to increase the cost of iron and steel materials to railroads by removing concessions made from published prices by restoring the full effect of innumerable extras now chargeable for deviations from basic quantities, sizes and standard composition, also by increasing the volume of buying from warehouses at prices which are usually 50 per cent higher than mill and also by causing increases in manufacturing costs which the small companies cannot absorb as readily as large steel makers who thrive on tonnage. Some roads paid $4 a ton more for cast iron pipe last October than in January, $6 a ton more for malleable castings and machine bolts, $1 a ton more for boiler plate and sheet steel, $2 a ton more for pig iron, $2 a ton more for brake shoes, $10 more for steel castings, $3 more for nails, and $2 more for cast iron wheels, and intentions to increase the prices of some railway appliances have been announced.

While the cost of new materials of iron and steel was rigidly managed, iron and steel scrap was less inflexible. From a high of $22.50 in October, 1939, heavy melting steel declined to $16.00 in March, 1940, following which it increased to an average of $20.67 in November despite the embargo placed on scrap export to Japan and prices would have been higher if the producers of scrap had not agreed to stop manipulating their tonnage to influence prices. Significant of trends is the fact that the spread between the prices offered for scrap in different territories has largely disappeared, which reflects a higher proportionate increase in the prices offered in the Chicago district than in the Pittsburgh district. All classes of railroad scrap, including cast iron wheels, showed increases last year and the present average, while

A. A. R. Average Prices for Making Repairs to Foreign Cars Exclusive of Stores Expense

	Unit	Unit Prices	Index Values Oct. 1940	March 1940	Oct. 1939
Pipe couplings 1-¼	ea.	$.079	99	104	105
" nipples 1¼x10	ea.	.087	89	90	97
" unions 1¼ ground	ea.	.320	105	111	113
" 1¼	ft.	.102	100	102	98
Bolts ¾x4½	lb.	.041	87	89	91
" 1¼x17	ea.	.253	96	97	99
" car ½x3	lb.	.014	98	99	98
Nuts sq. ⅞	lb.	.017	101	101	101
Bar iron, com.	lb.	.036	156	173	147
" steel, carbon	lb.	.023	96	100	96
Brake hangers	lb.	.086	115	110	115
Center plates	lb.	.054	102	104	104
Brake shoes, 1935 std.	ea.	.559	110	106	104
Castings, grey iron	lb.	.045	100	100	100
" mall	lb.	.070	92	93	90
" steel, to 100	lb.	.091	100	101	100
" " over 100	lb.	.075	90	92	91
Chain ½—7/16	lb.	.072	106	104	101
Couplers E 5x7	ea.	25.40	97	96	99
" E 6¼x8	ea.	27.39	96	96	99
Galv. steel 24 g.	lb.	.037	97	97	97
Journal box 9"	ea.	7.378	102	101	100
" " 10"	ea.	8.417	103	101	101
Lag screws	100	1.554	95	98	100
Nails	cwt.	2.695	97	98	94
Springs elliptical	lb.	.070	102	103	100
" helical	lb.	.053	104	104	105
Structural steel	lb.	.023	100	100	100
Steel plate carb	lb.	.023	104	105	104
" " H. T.	lb.	.035	95	95	98
" " copper	lb.	.023	100	104	100
Wheels, C. I. 33"	cwt.	1.97	110	103	107
" W. S. 33" heavy	ea.	33.44	101	100	100
" " 50 T light.	ea.	18.83	112	109	108
" " 70 T light.	ea.	20.63	112	107	107
Axles	cwt.	3.818	102	103	103
Brake beams #15	ea.	5.678	98	99	98
Draft gear	set	36.300	99	99	99
Journal brass	lb.	.121	102	100	100
Paint, car	gal.	.886	110	111	108
Rubber belt 5" 5 ply	ft.	.397	97	97	97
Elec. bulbs 50 w.	ea.	.232	102	104	101
Lubrication, pass. car	gal.	.174	101	104	102
Lumber, heavy	M.ft.	44.528	115	108	113
" light	M.ft.	50.390	131	116	123



All-year Average Costs of Railway Materials Compared to Wages and Earnings. 1914 equals 100.

only five per cent above October, 1939, reflected an increase of 22 per cent from the low point last spring. This was more than enough to off-set the increased cost for lumber and finished steel to some railroads.

Average Relative Value of New Equipment and Material for Light Weight Cars

Equipment	Unit Cost	Cents per lb.	Dollars per. H. P.
Box cars	$2,580	58	
Automobile cars	3,180	62	
Gondola Cars	2,360	50	
Refrigerator cars	3,200	72	
All freight cars	2,700	55	
Chair cars	70,000	40	
Dining cars	95,000	62	
Club cars	95,000	82	
Sleeping cars	75,000	55	
All passenger train cars	45,000	38	
Passenger locomotive steam*	150,000	25	$35
" " oil-elec.*	450,000	45	90
" " electric*	300,000	65	55
Switching " oil-elec.	85,000	45	80
Passenger trains average	1,500,000	55	
Material			
Sheet metal carbon steel		2.5	
" " copper steel		2.6	
" " low alloy high tensile steel		3.9	
" " aluminum—strength basis		20.0	
" " stainless steel		35.0	

* Reasonably equivalent service.

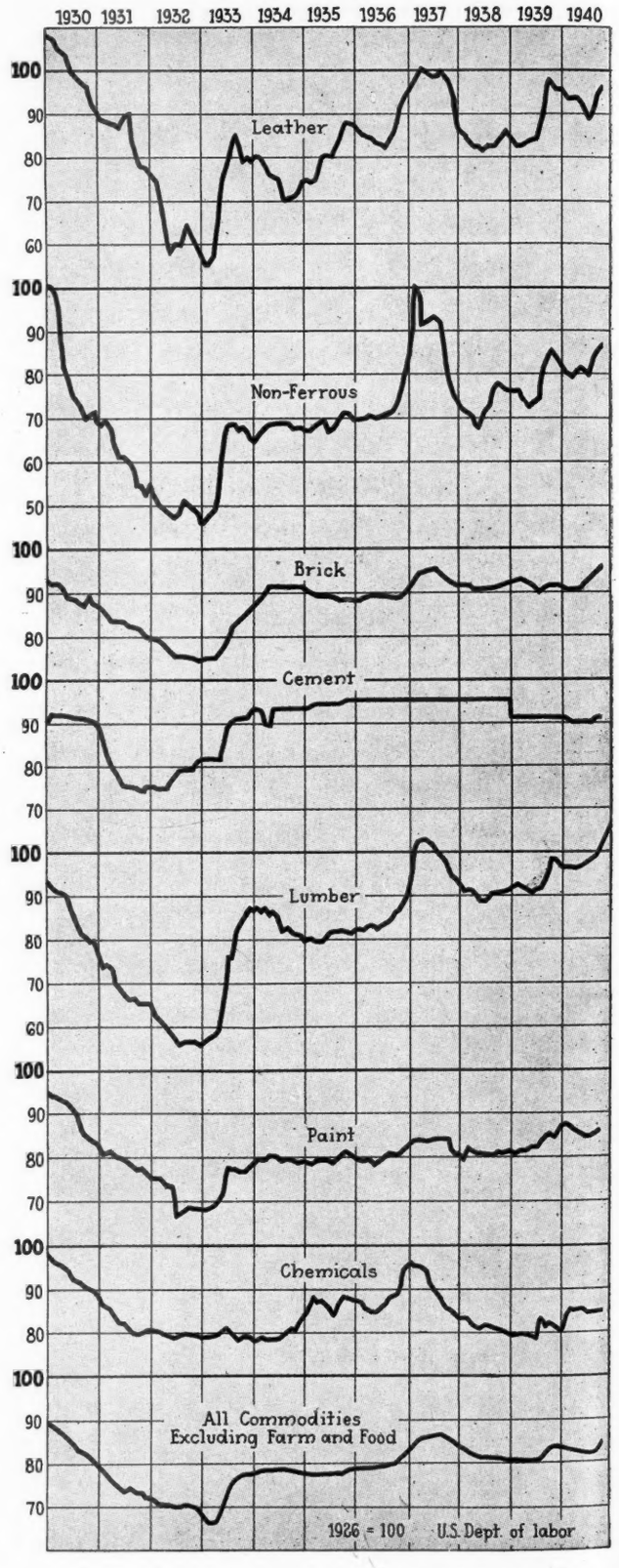
National Defense Board Acts

The National Defense Advisory Commission announced on December 21 that meetings with members of the scrap, pig iron and perhaps other industries will be called in the immediate future to discuss the price situation in these and related fields. These conferences have been scheduled as a result of a meeting held December 19 with representatives of both integrated and non-integrated steel companies. At that conference recent price developments in the steel and related industries were reviewed by representatives of steel companies and of the Price Stabilization Division. It was pointed out that while prices of scrap, pig iron and coke changed little for nearly two months following a similar meeting on October 8, they have moved upward during December. It was agreed that steel makers cannot continue indefinitely to absorb the increased cost of raw materials entering into their product without ultimate reflection in a higher price of finished steel—a result which steel manufacturers do not desire. Dealers in scrap also agreed that they do not wish to see the price of that raw material increase and sellers of scrap who also are purchasers of finished steel desire to see scrap and steel prices held down.

Lumber Soars

Lumber prices were being maintained last year at levels only slightly under the highest prices paid in 1939 by the largest program of private and public construction since 1929 before the government ordered its requirements for army camps. Most of these orders were released in the 60 days preceding the national election and their effect was electric. All stocks of dry lumber were soon exhausted and even contractors of government projects were authorized to buy dimension lumber wherever they could find it and pay any price for it. Conditions were further complicated by a seamen's strike on the west coast which partially tied up coastwise shipping from October 4 to November 30 and also by strikes for higher wages in the lumber camps, which shut the Tacoma mills from September 5 to November 30 and then began spreading to other mills in Washington and Oregon.

The railroads faired better than most consumers because their buying was steady and conducted without disturbing routine procedure. Some roads even obtained lumber without appreciable increases in cost. One road paid no more in October for car sheathing than last January, and bought stringers for $1 less. However, increases were general and substantial, pine car siding averaging $9.30 or 25 per cent higher in Oc-



Comparative Month-to-Month Trends of Wholesale Prices

tober than last January, car sheathing averaging $8.10 or 20 per cent higher, car sills averaging $6.50 or 28 per cent higher and stringers averaging $4 or 20 per cent more on ten representative roads. Mill prices of 24 items of railway lumber on the west coast averaged 19 per cent higher in December than in December, 1939.

Both tie prices and production were noticeably steady during the first half of 1940 except in sections where mill operations were temporarily stopped until the effect of the enforcement of the wages and hours law requiring increased wages for common labor could be determined. As the season progressed the government's requirements of ties for national defense projects and the reduction in the available labor supply became factors in the market. This led to increases in tie prices, which while not wide spread, appear to have raised average costs slightly except in central eastern territory where prices have not changed since October 1939. Four of five roads paid no more for pine ties in 1940 than in 1939 while one road paid 20 cents more per tie. One road of six paid five cents more for fir cross ties while white oak ties were unchanged. Mill prices on fir sawed ties averaged five per cent higher in December, 1940, than in December, 1939. There is no general demand for higher prices at this time and most railroads have already prepared for their 1941 programs and some railroads for a part of their 1942 requirements but it is understood that estimates of this year's renewals are

Non Ferrous Metal Cents per pound

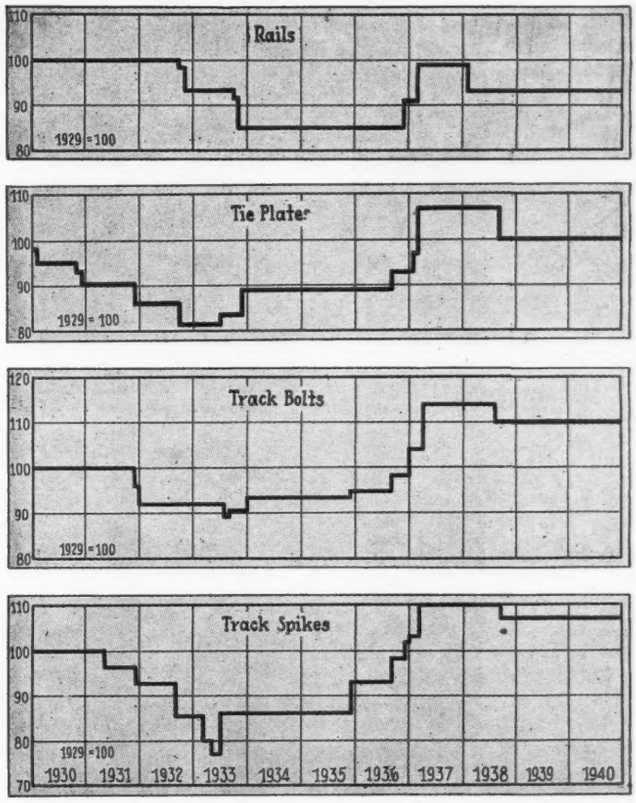
	Copper Electrolytic	Zinc	Lead	Tin	Aluminum
1929	18.11	6.87	6.83	45.16	23.90
1930	12.99	4.90	5.52	31.63	23.40
1931	8.11	3.98	4.24	24.43	21.80
1932	5.55	3.25	3.18	21.98	21.80
1933	7.03	4.40	3.87	39.12	21.80
1934	8.41	4.51	3.86	52.23	21.50
1935	8.63	4.70	4.06	50.39	18.50
1936	9.45	5.27	4.71	48.48	18.50
1937	13.15	6.90	6.02	54.29	19.50
1938	9.98	4.98	4.74	42.23	19.50
1939	10.95	5.51	5.06	49.11	19.50
1940	11.64	6.22	5.23	49.49	17.00

subject to upward revision and that the tie producers' costs for labor and taxes are also in the process of adjustment. Higher prices are being paid for practically all ties for national defense projects and railroads are not only supplying large quantities of these ties from their own stocks but some railroads are getting higher prices for them than have been asked by commercial producers.

During the 50 weeks of 1940 ending December 14, 475 mills produced 11,404,000 ft. of lumber which was six per cent over the corresponding production of 1939 and unfilled orders on December 14 amounted to 1,076,000,000 bd. ft. which exceeded the unfilled orders on December 16, 1939, by 350,000,000 bd. ft. or 32 per cent.

While all but about 200,000,000 ft. of the lumber for army camps was ordered last year and while present prices owe their inflated condition to army orders, neither these orders nor orders placed last year for the lumber for other new construction work in the national defense program were all filled last year, which makes both the carry-over and the unsettled labor trouble factors in this year's prices, at least until April.

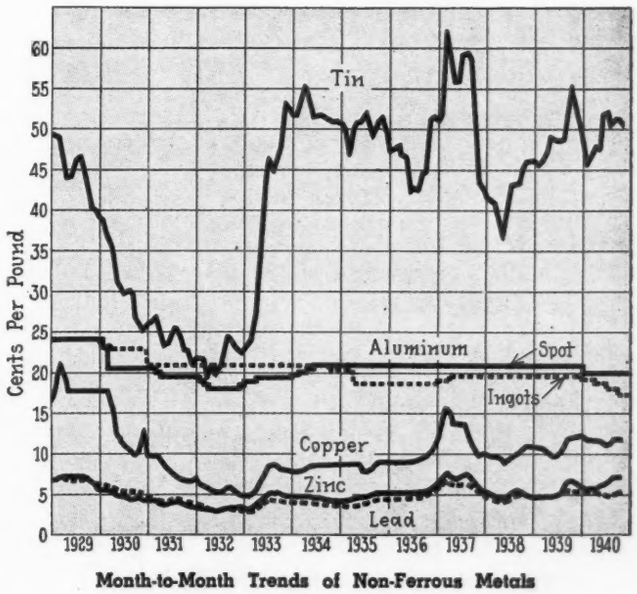
In British Columbia, the Canadian government created a lumber control board which set the base price on lumber for government purposes and commercial and domestic sales were also governed to a considerable degree by these prices. The Canadian government purchased



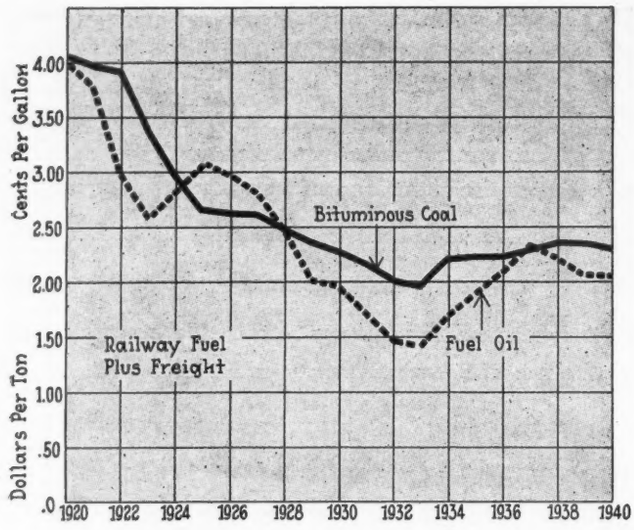
Comparative Trends in Base Prices of Track Materials. 1929 equals 100

large quantities of dimension lumber last year for its war requirements, which cleaned out all mill stocks of dry dimensions in a few weeks and mill operations in that section were further stimulated by extensive purchases for use in the United States. However, prices were noticeably stable and while the year-end prices of car sheathing and timber were from $2.50 to $4.00 higher per M. bd. ft. than early in the year, car lumber now averages about the same as at this time a year ago. Ties were unchanged last year from 1939 levels but are now being purchased at five cents more per tie.

The average prices paid last October by the railroads



Month-to-Month Trends of Non-Ferrous Metals



Yearly Average Costs of Coal and Fuel Oil for Locomotives Class I Railways

for pig lead, copper sheet, copper wire and car brass were either unchanged or were less than were paid at this time a year ago. The prices averaged higher, however, than in 1939 and in 1938. Manila rope averaged slightly less than in October than at this time a year ago, waste averaged $4 a ton less, welding electrodes cost some roads $10 less per ton than in 1939 and averaged $6 less per ton. Linseed oil averaged 13 cents less per gal. in October than in January, and paint averaged 25 cents less in price at the close of the year than one year previous. Further details are given in the accompanying tables and charts.

Equipment Prices

More issues of equipment trust certificates were authorized by the Interstate Commerce Commission and sold through bankers or the Reconstruction Finance Corporation in 1940 than any year of the depression except 1937 and the total principal amount involved in 1940 exceeded even that of 1937. Commission reports issued in connection with their authorization furnish considerable detailed information, including the only official equipment price quotations currently made public. Since an unusually large body of rolling stock was purchased under financing of this type during the year, these price quotations furnish a fairly wide sampling of the 1940 price situation.

Equipment information set forth in the accompanying tables has been lifted from the I. C. C. authorization reports described above. Inasmuch as the latter do not conform to any principles of completeness—giving in some cases only the number of units and total purchase

Partial List of 1940's Locomotive Prices

No.	Type	Service	Weight lb.	Tractive Force—lb. or hp.	Unit Price
14	Diesel-Elec.	Psgr.	313,300	2,000 hp.	180,069
4	Diesel-Elec. (cabless)	Psgr.	303,600	2,000 hp.	167,882
8	2-8-8-4	Frt.	712,000	140,000	246,570
4	Diesel-Elec.	Pass.	313,000to	2,000 hp.	171,000
1	Diesel-Elec.	Pass.	414,200	2,000 hp.	177,200
1	Diesel-Elec.	Pass.	313,300	2,000 hp.	178,000
1	Diesel-Elec.	Sw.	250,000	1,000 hp.	82,193
1	Diesel-Elec.	Sw.	200,000	600 hp.	62,607
4	Diesel-Elec.	Sw.	200,000	660 hp.	61,000
5	Diesel-Elec.	Sw.	88,000	380 hp.	29,475
1	Diesel-Elec.	Psgr.	247,340	1,000 hp.	137,573
2	Diesel-Elec.	Psgr.	317,000	2,000 hp.	175,000
7	Diesel-Elec.	Sw.	195,000	660 hp.	62,250
25	Loco. Tenders	....	.....	.....	28,500
2	4-4-4-4	Psgr.	501,500	78,500	300,000
1	Diesel-Elec.	Psgr.	308,495	2,000 hp.	178,715
3	Diesel-Elec.	Sw.	198,000	600 hp.	61,100
5	Diesel-Elec.	Sw.	250,000	1,000 hp.	81,800
20	4-8-4	Psgr.	469,000	79,660	172,891
1	Diesel-Elec.	Sw.	199,000	660 hp.	62,500
12	4-6-6-4	Frt.	604,000	95,500	197,060
7	2-8-4	Frt.	408,000	64,100	127,725
3	Diesel-Elec.	Psgr.	313,300	2,000 hp.	176,289
2	Diesel-Elec.	Psgr.	616,300	4,000 hp.	344,442
5	2-10-4	Frt.	520,000	109,935	158,850
2	0-8-0	Sw.	279,000	64,309	84,250
8	4-8-4	Psgr.	511,000	66,000	161,000
2	4-8-4	Psgr.	511,000	66,000	173,000
10	Tenders	....	.....	.....	44,300
1	Diesel-Elec.	Psgr.	616,300	4,000 hp.	179,000
1	Diesel-Elec.	Psgr.	600,000	4,000 hp.	170,000
1	Diesel-Elec.	Psgr.	616,300	4,000 hp.	178,000

Some of 1940's Freight Car Prices

No.	Type	Construction	Capacity lb.	Unit Price
728	Auto-Box	Steel	100,000	3,084
100	Furn.-Auto	Steel	100,000	3,433
500	Hopper	Steel	110,000	2,157
200	Gondola (H. Side)	Steel	100,000	2,372
100	Phosphate	Steel	140,000	3,500
50	Stock	Steel-Frame	80,000	2,850
15	Cement (Cov. Hopper)	Steel	140,000	3,604
1000	Box (Wag. Top)	Steel	100,000	2,750
750	Gondola	Steel	140,000	3,146
250	Gondola	Steel	140,000	3,439
500	Gondola	Steel	140,000	3,148
500	Box	Steel	100,000	2,942
1000	Hopper	Steel	100,000	2,619
100	Cement (Hopper)	Steel	140,000	2,650
300	Box	Steel	100,000	2,834
200	Box	Steel	100,000	2,875
200	Box	Steel	100,000	2,872
200	Box	Steel	100,000	2,838
100	Box	Steel	100,000	3,863
50	Caboose	Steel	.....	4,442
50	Caboose	Steel	.....	4,439
800	Box	Steel	100,000	2,635
200	Auto	Steel	100,000	3,350
100	Gondola (L. Side)	Steel	140,000	3,356
500	Box	Steel	100,000	2,900
500	Hopper	Steel	100,000	2,650
100	Gondola (L. Side)	Steel	140,000	3,250
500	Box	.....	100,000	3,396
30	Ballast	Steel	100,000	3,380
10	Covered Hopper	Steel	140,000	4,340
500	Box	Steel-Sheath	100,000	3,088
500	Box	Steel-Sheath	100,000	3,089
1000	Box	Steel-Sheath	80,000	3,015
500	Box	Steel-Sheath	80,000	3,314
250	Auto-Box	Steel-Sheath	80,000	3,293
250	Auto-Box	Steel-Sheath	80,000	3,271
30	Cement (Cov. Hopper)	Steel	140,000	3,775
1000	Box	Steel	80,000	2,036
250	Hopper	Steel	100,000	2,162
250	Hopper	Steel	100,000	2,547
25	Caboose	Steel	.....	5,020
1000	Box	Steel-Sheath	100,000	2,876
500	Gondola	Steel	100,000	2,936
400	Hopper	Steel	100,000	2,196
100	Ballast	Steel	140,000	3,385
200	Gondola	Steel	140,000	3,330
1900	Gondola	Steel	140,000	2,896
225	Cov. Hopper	Steel	140,000	3,600
20	Flat	Steel	224,000	10,000
200	Caboose	Steel	.....	4,500
200	Box	Steel	100,000	2,810
150	Box	Steel	100,000	2,824
150	Box	Steel	100,000	2,850
50	Auto-Furn.	Steel	100,000	3,877
50	Auto-Box	Steel	100,000	4,847
200	Gondola	Steel	140,000	3,191
50	Cement (Hop. Bot.)	Steel	100,000	3,460
1500	Box	Wood-Lined	80,000	2,455
750	Hopper	Steel	100,000	2,095
821	Gondola	Steel	100,000	2,211
250	Gondola	Steel	100,000	2,030
1500	Box	Steel-Sheath	100,000	2,897
500	Auto-Box	Steel-Sheath	100,000	3,661
65	Hopper	Steel	100,000	2,300
300	Box	Steel	100,000	2,734
200	Box	Steel	100,000	2,732
3000	Hopper	Steel	.....	2,330
100	Box (End Door)	Steel	.....	3,700
50	Gondola	Steel	.....	3,347
300	Hopper	Steel	100,000	2,375
250	Hopper	Steel	100,000	2,329
250	Hopper	Steel	100,000	2,375
250	Gondola	Steel	140,000	3,228
200	Box	Steel-Sheath	100,000	2,919
100	Box	Steel-Sheath	100,000	2,961
100	Furn.	Steel-Sheath	100,000	3,939
50	Flat	Steel-U. F.	140,000	3,299
650	Hopper	Steel	180,000	4,195
300	Box	Wood-Lined	100,000	3,580
100	Box	Wood-Lined	100,000	3,400
50	Flat	Steel	100,000	3,120
20	Caboose	Steel	.....	6,954
2000	Box	Steel	100,000	3,015
300	Ballast	Steel	140,000	3,380
200	Gondola	Steel	100,000	2,810
50	Gondola	Steel	140,000	3,440
200	Gondola (Hop. Bot.)	Steel	100,000	2,735
50	Flat	Steel	140,000	3,330

price for the group—it has been necessary to fill in the gaps whenever possible from other available sources.

In view of their source, the prices can in no sense be considered as true indices of equipment price levels or trends. Large as it is, the total equipment financed through equipment trust certificates is yet but a part of the total year's purchases financed by direct cash outlay, conditional sale contracts or other credit machinery. The I. C. C. reports list, for example, some 66 steam locomotives, whereas more than 200 are known to have been purchased during the year; still greater disparity arises in the case of Diesel-electrics, only 63 of which, out of a total of 462 ordered, were financed by trust issues. Furthermore, no price information is available concerning the large number of freight cars purchased by the private car lines which are not required to report on their financing to the Commission.

Some of 1940's Passenger-Train Car Prices

No.	Type	Length	Seating Capacity	Weight lb.	Unit Price
1	Dining	84 ft. 6 in.	48	117,092	90,398
1	Coach	84 ft. 6 in.	52	110,196	66,373
2	Coach	84 ft. 6 in.	60	107,728	64,340
1	Coach	84 ft. 6 in.	60	107,728	64,733
1	Bagg.-Dorm.	84 ft. 6 in.	22	106,054	70,851
1	Lounge-Obs.	84 ft. 6 in.	54	107,048	86,865
2	Rail-Motor (450 hp.)	.....	69 & 61	96,360	71,000
1	2-Car Rail-Mot. (900 hp.)	.....	73 & 48	.....	181,650
3	Mail-Bagg.	84 ft. 6 in.	..	99,469	54,000
3	Obs.-Parl.-Diner	84 ft. 7 in.	41	111,424	95,000
5	Coach	84 ft. 6 in.	74	106,893	70,000
2	Parl.-Obs.	80 ft. ½ in.	40	.....	83,862
2	Chair	81 ft.	50	.....	72,464
7	Chair	81 ft.	50	.....	72,308
6	Pass.-Bagg.	84 ft. 6 in.	22	103,000	55,400
15	Coach	84 ft. 6 in.	56	105,500	53,940
6	Coach	84 ft. 6 in.	52	106,500	56,700
5	Dining	84 ft. 6 in.	48	112,500	74,200
3	Lounge-Tavern	84 ft. 6 in.	55	105,000	74,750
3	Obs.-Lge.-Tav.	84 ft. 6 in.	55	105,000	75,350
2	Mail-Bagg.	84 ft. 6 in.	..	91,500	45,975
2	Mail-Bagg.	84 ft. 6 in.	..	95,000	47,500
2	Mail-Storage	84 ft. 6 in.	..	88,500	43,100
1	Bagg.	63 ft. 1¾ in.	..	79,000	55,000
1	Bagg.-Mail	73 ft. 10 in.	..	85,000	62,500
14	Chair	83 ft. 10 in.	52	101,000	68,300
1	Lunch-Diner	83 ft. 2 in.	38	117,000	87,200
2	Club-Lounge	79 ft. 8 in.	47	102,000	79,800
1	Chair-Obs.	79 ft. 11 in.	60	99,000	84,000

Again, many details of construction and accessories are omitted almost entirely from the reports—although the cost of such accessories or special features often comprises a sizeable proportion of over-all prices. Whether or not a new box car is fitted with extra doors for l. c. l. loading, equipped for end-loading or fitted with automobile handling devices has great weight on its price tag. More especially is this omission important with respect to passenger equipment. Almost without exception, units of this category appearing in I. C. C. reports in 1940 were purchased for new "named" trains to specifications requiring costly materials and standards of construction. Some of them were equipped with buffet-lounge sections, stewardess' quarters, dormitories, etc., expensive features which are not cited in the reports. The requirements of today's passenger service show more disparity as between runs and roads than ever before, and the accompanying unadorned price quotations are, therefore, of but limited significance.

Although the majority of the passenger cars covered by the reports were purchased as individual trains or to fill out recently built trains to care for increasing business, they are here listed as individual units whenever the information available makes such treatment practicable.

The table omits however a number of units comprising trains for which only the total price is given and a group of articulated units. For convenience they are noted textually as follows: 28 chair cars articulated in pairs priced at $126,702 per pair; 2 groups of three articulated cars each, consisting of a diner, kitchen car and coffee-shop car, at a total estimated price of $441,516; 2 groups of three articulated cars each, consisting of lounge, diner and kitchen-dormitory, at a total price of $481,816; 3 baggage-dormitory, 2 dining, 3 observation-end, coach-buffet-lounge cars and 7 coaches at a total price of $995,000; 1 all-steel passenger train of 8 cars at $610,000; 1 two-car streamlined train at $155,000; and a group of seventeen 85-ft., all-steel, air-conditioned passenger-train cars comprising 8 coaches, 3 passenger-baggage cars, 3 tavern-lounge-observation cars and 3 dining cars, the whole of which is accorded the lump sum price of $1,188,069.

Little Light in Financial Gloom

(*Continued from page 60*)

were reduced from 3.7 billions to 1.6—or by approximately 57 per cent.

Anyhow, although a large railway mileage still remains in the hands of the courts, 1940 can at least claim the unusual distinction for these days of being the only year for a long time which saw no new bankruptcies.

R. F. C. Loans

At the end of November, 1940, the Reconstruction Finance Corporation had paid out $783,201,022 in loans to the railroads and had received $315,282,440 from the railroads in repayment, leaving net indebtedness at $467,918,582. At the end of November, 1939, the carriers' net indebtedness to the R. F. C. was $431,501,283. These figures do not include P. W. A. loans to the railroads, evidences of which have been taken over by the R. F. C. and, in many cases, sold to bankers at a substantial profit. An accompanying table gives the detailed status of R. F. C. loans to the railroads.

Railway Buying Again Exceeds a Billion Dollars

(*Continued from page 65*)

ing on different roads, should be fairly constant one year with another.

The ratio for the Class I railroads was fairly constant from 1925 to 1929 and the ratio of materials and supplies, purchased to operating revenues, exclusive of fuel, averaged 15.7 per cent. After 1929 purchases of materials and supplies, exclusive of fuel, declined faster than revenues until after 1933, when they rose faster than revenues. In 1937 they exceeded 15.7 per cent of revenues for several months but the average was less again in 1938, 1939 and 1940. By comparing the purchases with the operating revenues month by month and making suitable adjustments for changes in average material costs, the deduction is made that during the period from 1929 to October, 1940, the railroads purchased $1,094,000,000 less materials and supplies, exclusive of fuel and equipment, than they would have purchased if they had continued to buy proportionately as much materials and supplies as in the years before the depression. This is the same as saying that an aggregate deficiency of $1,094,000,000 of materials has accrued on the railroads up to October, 1940.

Moderate Increase Shown in Construction

Still further gain in prospect as improvement in business demands expansion of facilities to expedite traffic

By George E. Boyd
Associate Editor

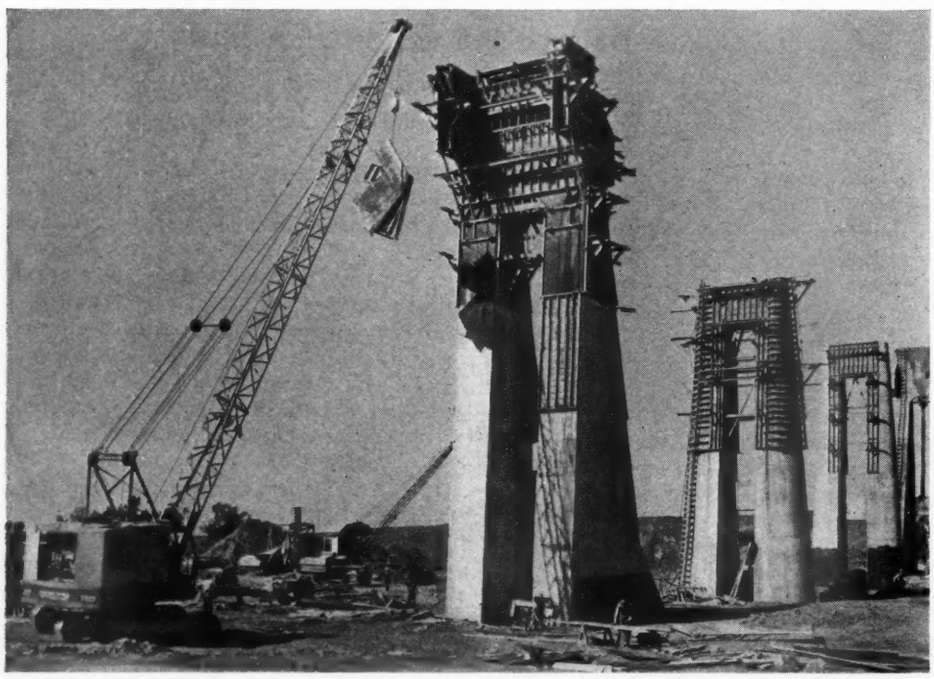
IT was apparent at the beginning of the year that, unless a situation arose that could not be foreseen, there would be a considerable increase in construction activity on the railways during 1940. As earnings continued at a higher level, this expectation was fulfilled and while, compared with the years prior to 1930, the increase in construction was only moderate, the resulting activity was greater than at any time during the decade just closed. In these disturbed times one cannot safely make predictions very far in advance, but with the prospect that business activity will continue to increase, all signs point to a still larger amount of railway construction during 1941.

No general and very little local expansion of the railway plant has occurred since 1929, and no construction of consequence in the way of internal improvements has been undertaken during the decade just closed, primarily because earnings have remained at so reduced a level that, with only a few exceptions, the railways have found it to be impracticable to finance projects of any considerable magnitude. Yet, during this same period the requirements of operation and traffic have changed more radically than during any similar period in railway history. So completely have the methods of operation changed and so great is the need for expediting traffic, that facilities that were up to the minute as recently as 10 years ago are today completely outmoded, and most of those that are of earlier design are hopelessly obsolete, and both should be replaced with new facilities designed to make the newer methods fully effective.

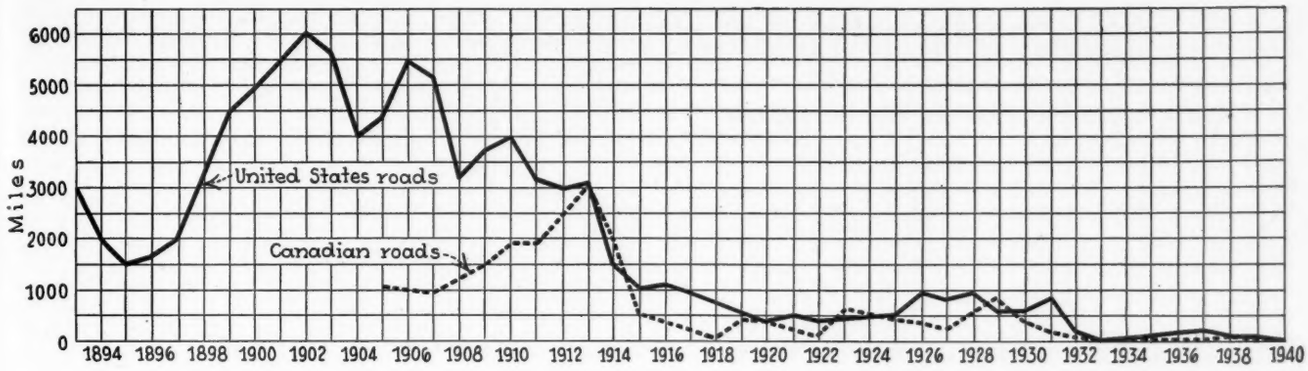
While this situation has been developing for several years and has already reached the stage where lack of suitable facilities is interposing a serious obstacle to effective operation, a new movement is now getting well under way that will aggravate still further the need for modern facilities. This refers to the growing practice of operating high-speed freight trains to insure earlier delivery of

Miles of Main Track Built in 1940

United States	Number of companies building	First track	Second track	Third track	Fourth track	Total
Arizona	1	....	23.42	....	....	23.42
Colorado	1	....	1.72	....	....	1.72
Louisiana	1	8.00	....	....	....	8.00
Michigan	1	5.23	....	....	....	5.23
Minnesota	1	....	0.78	....	....	0.78
Nevada	1	8.71	....	....	....	8.71
Oklahoma	1	0.05	....	....	....	0.05
Tennessee	1	4.00	....	....	....	4.00
		25.99	25.92			51.91



Setting Last Form for Concreting One of the 90-Ft. Piers on the New Line of the Santa Fe Around the John Martin Reservoir, Caddoa, Colo.



New Lines Constructed in the United States in 1940 Aggregated 26 Miles. Canada Completed only 2 Miles

merchandise at distant points. In addition to these considerations, in not a few instances this lack of up-to-date facilities is hampering the development of still other methods that will make possible greater despatch in the movement of other commodities, or is preventing more economical operation. Furthermore, inability to carry out needed improvements has made it impossible for some roads to meet competition effectively.

Even under the most favorable circumstances, railway facilities suffer from a high rate of obsolescence, but as a result of these radical changes in operating methods and of deferred construction, more railway facilities are obsolete today than at any previous time. For these reasons, there is need for a vast program of construction and reconstruction that will affect every type of railway facility and that will overshadow all former programs.

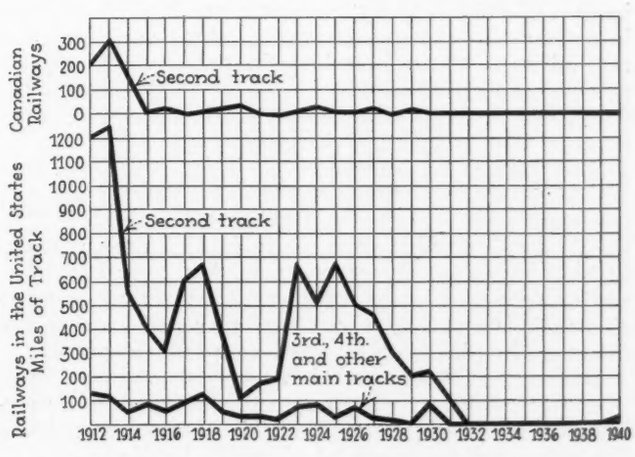
Miles of New Lines Completed in the United States Since 1830

Year	Miles	Year	Miles
1830	40	1886	8,400
1831	99	1887	13,081
1832	191	1888	7,066
1833	116	1889	5,707
1834	214	1890	5,739
1835	138	1891	4,620
1836	280	1892	4,648
1837	348	1893	3,024
1838	453	1894	1,760
1839	386	1895	1,420
1840	491	1896	1,692
1841	606	1897	2,109
1842	505	1898	3,265
1843	288	1899	4,569
1844	180	1900	4,894
1845	277	1901	5,368
1846	333	1902	6,026
1847	263	1903	5,652
1848	1,056	1904	3,832
1849	1,048	1905	4,388
1850	1,261	1906	5,623
1851	1,274	1907	5,212
1852	2,288	1908	3,214
1853	2,170	1909	3,748
1854	3,442	1910	4,122
1855	2,453	1911	3,066
1856	1,471	1912	2,997
1857	2,077	1913	3,071
1858	1,966	1914	1,532
1859	1,707	1915	933
1860	1,500	1916	1,098
1861	1,016	1917	979
1862	720	1918	721
1863	574	1919	686
1864	947	1920	314
1865	819	1921	475
1866	1,404	1922	324
1867	2,541	1923	427
1868	2,468	1924	579
1869	4,103	1925	644
1870	5,658	1926	1,005
1871	6,660	1927	779
1872	7,439	1928	1,025
1873	5,217	1929	666
1874	2,584	1930	513
1875	1,606	1931	748
1876	2,575	1932	163
1877	2,280	1933	24
1878	2,428	1934	76
1879	5,006	1935	45
1880	6,876	1936	93
1881	9,789	1937	148
1882	11,599	1938	38
1883	6,819	1939	58
1884	3,974	1940	26
1885	3,131		

With the outlook favorable for traffic to remain at its present or a higher level, with improved earnings, and in view of the pressing need for additional and modern facilities for handling expeditiously the traffic that is offered, the prospect is that there will be a still further increase in construction activity, particularly of the smaller projects, and a moderate increase in the number of more important projects. If business remains on a permanently better basis, this activity will increase, for there is now a suppressed need for a vast and widespread program of improvements such as has never before been undertaken.

Construction projects fall into two groups regardless of other classifications—those that can be paid for out of current earnings and those of greater magnitude that must be financed by means of borrowed funds. Reports from all sources indicate that more projects in the first group were undertaken in 1940 than for a decade, although this is reflected to only a limited extent in the tabulation at the end of this article, since it includes only those projects costing approximately $100,000 or more. Yet study will show also that a considerable number of projects in the second group were under way or completed during the year.

For many years the railways have engaged extensively in the elimination of grade crossings, mainly at their own expense. Beginning with 1936, however, an unprecedented amount of grade-separation work has been carried out in all sections of the country, primarily by reason of federal grants to states and municipalities for this purpose. As the original federal appropriations, amounting to $200,000,000, were exhausted, this type of construction fell off rapidly as the larger projects were completed during 1937. Succeeding this, appropriations were smaller and most of the projects were of a magnitude that could be finished in the year in which they



Twenty-Six Miles of Multiple Tracks Were Completed in 1940

were undertaken. Today, the projects are being selected on a basis of maximum benefits, so that while the number is somewhat smaller, the grade separation program is becoming more stabilized.

Miles of New Lines Completed in Canada Since 1904

Year	Miles	Year	Miles
1904	316	1923	655
1905	1,181	1924	615
1906	1,007	1925	414
1907	976	1926	335
1908	1,249	1927	310
1909	1,488	1928	723
1910	1,844	1929	841
1911	1,898	1930	385
1912	2,232	1931	250
1913	3,013	1932	121
1914	1,978	1933	0
1915	718	1934	1
1916	290	1935	2
1917	207	1936	1
1918	135	1937	0
1919	433	1938	101
1920	305	1939	1
1921	252	1940	2
1922	145		

New Line Mileage Drops

It has been noted for many years that the mileage of new lines under construction or completed during any year provides an excellent index of railway construction activities as a whole, and this belief is fully borne out by analysis of construction records over a long period. Surprising as it may seem, this rule holds good during periods of reduced construction as well as during more active periods. The fact that only 26 miles of new lines were completed in the United States in 1940, compared with 58 miles in 1939, seems to contradict this statement in view of the fact that there was a considerable increase in construction during the year. It happened, however, that 33 miles of the lines built in 1939 were to replace an equal mileage flooded by one of the government power dams, and that this mileage was not in the nature of an external improvement.

This mileage for the year, while insignificant compared with the construction activities of 30 or more years ago, compares with 38 miles in 1938 and 24 miles in 1933, the smallest recorded since the inception of the railways in 1830. It is of interest, however, that several new line projects are now under consideration, mainly in connection with line revisions, but are being held in abeyance because of difficulties connected with financing them.

During the 20-year period ending with 1920, the mileage of new lines completed annually varied from a maximum of 6,026 in 1902 to 314 in 1920, the former being the largest mileage recorded since 1888, which was during the period of feverish railway expansion, and the latter being the smallest mileage up to that time since 1847 when the long period of railway expansion was beginning. During the 20-year period ending with 1940, the largest mileage completed in any year was in 1928, when 1,025 miles were placed in operation, and the smallest was the 24 miles completed in 1933. It is significant that the average mileage completed year by year during the former two decades was 3,129, while the average for the latter period was only 393 miles. These figures point impressively to the fact that the days of large external developments are past, and that future expenditures will be applied more and more for internal improvements and for expansion of those facilities that will expedite the movement of traffic.

Of the 26 miles of new lines placed in service during the year, 8 miles represented a branch line built by the Missouri Pacific in Louisiana; 8.71 miles was represented by an old industrial road purchased by the Union Pacific and rehabilitated for service; 5 miles were constructed by the Chicago & North Western at Clowry, Mich., and 4 miles by the Tennessee in Campbell County, Tenn.

From 1932 to 1937 inclusive, extension of main-track mileage in Canada was confined to a few projects involving line revisions and was offset by corresponding abandonments. In 1938, a new line 100 miles long was completed in Quebec, but in 1940 the two miles of new lines that were recorded were also built in connection with two line revisions.

Consolidating Earth Fill on the 20-Mile Relocated Line of the Santa Fe at Caddoa Dam Near Caddoa, Colo.

Miles of Lines Abandoned in the United States Since 1917

Year	Miles	Year	Miles
1917	942	1929	475
1918	959	1930	694
1919	637	1931	795
1920	536	1932	1,452
1921	1,626	1933	1,876
1922	677	1934	1,995
1923	513	1935	1,843
1924	693	1936	1,523
1925	606	1937	1,140
1926	457	1938	1,897
1927	282	1939	1,783
1928	512	1940	1,299

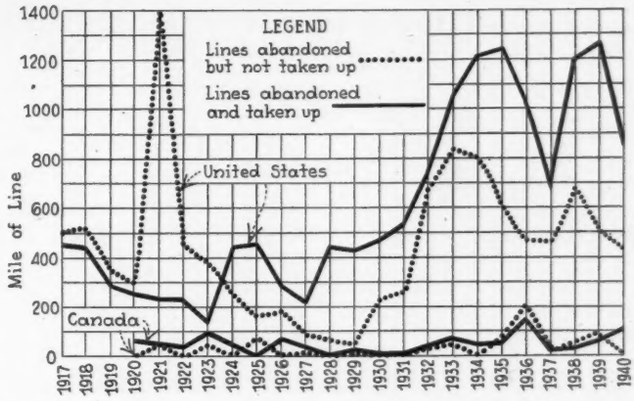
Multiple-Track Mileage

There was a sharp rise in the amount of multiple-track mileage, from 9.03 miles in 1939 to 25.92 miles in 1940, all of which was second track, no third or fourth track having been completed during the year. Substantially all of this increase was accounted for by the 23.42 miles of second track constructed by the Atchison, Topeka &

Santa Fe between D. T. Junction, Ariz., and Joseph City, as a concluding step in its program of double-tracking its line between Chicago and California. While this is more than three times the amount of second track completed in 1939, it stands in strong contrast with the more than 1,200 miles of second track completed in 1913, and as much as 600 to 700 miles in subsequent years.

Likewise, during the period since 1912, the mileage of third, fourth and other main tracks has exceeded 100 miles in each of seven years, but has been negligible since 1932, and in 1940 none was built. Since 1925, there has been a general trend toward the restriction of multiple-track mileage, as a result of developments in the signaling field, which has greatly increased the traffic capacity of existing main tracks, making the construction of additional tracks less necessary. With the further extension of centralized traffic control that is probable, multiple-track construction should remain low for some years to come.

A class of track that has not been in evidence heretofore made its appearance late in the year and three projects were under construction at the end of the year. These are tracks being built to serve munition plants, training camps, military and ordnance depots and fortified areas. While only three projects of this character were actually under way at the end of the year, not a few roads reported prospective construction aggregating many miles of such lines. In some instances, the railways from which the tracks branch are being asked to construct the lines, in others, the construction will be undertaken by the army or navy, depending on the facility served. In any event, it is expected that a considerable mileage of such tracks will be constructed during the year.



Abandonments in the United States Exceeded 1,000 Miles for the Tenth Time. Those in Canada Aggregated 111 Miles

Miscellaneous Construction

Among the larger projects completed or still under construction, the New York Central has continued work on its West Side improvement in New York. While this project is now practically completed, it is of such a nature that it has been necessary to carry it out on an orderly schedule of consecutive items, for which reason it has been spread over a number of years. Likewise, the Pennsylvania has continued work on its Philadelphia Terminal Improvement. Most of the remaining construction projects of magnitude were for the purpose of facilitating the movement of traffic and included three large grain elevators at widely separated points; five projects involving the construction or enlargement of

Mileage Abandoned 1932 to 1940, Inclusive

	1932	1933	1934	1935	1936	1937	1938	1939	1940	Total
Alaska	....	18.27	....	....	....	3.00	195.20	....	....	216.47
Alabama	20.82	28.08	36.22	....	42.09	9.95	1.64	21.96	20.40	181.16
Arizona	....	126.51	15.49	17.04	....	....	16.00	8.49	8.73	192.26
Arkansas	8.17	37.85	51.28	42.35	23.95	83.43	51.10	5.59	51.39	355.11
California	0.77	185.65	116.00	70.57	30.57	74.23	34.27	37.71	148.72	698.49
Colorado	26.39	56.57	6.31	84.98	86.30	231.46	26.29	77.43	....	595.73
Connecticut	....	....	....	33.93	....	25.31	50.25	....	16.88	126.37
Delaware	....	....	....	....	33.16	....	3.07	....	0.88	37.11
Florida	70.09	69.59	28.13	1.47	165.22	....	12.00	40.91	....	387.41
Georgia	66.41	46.56	126.63	12.34	....	....	85.26	39.70	0.99	377.89
Idaho	15.41	....	4.63	46.78	16.00	....	....	84.52	....	167.34
Illinois	54.83	38.30	160.82	13.90	32.06	87.42	29.41	57.14	26.25	500.13
Indiana	14.80	25.66	....	69.70	0.12	....	....	....	5.23	115.51
Iowa	53.12	79.51	52.44	83.32	208.75	14.44	120.58	55.88	90.01	758.05
Kansas	....	128.97	162.64	236.85	51.33	21.04	....	50.73	....	651.56
Kentucky	78.17	74.27	22.89	7.86	....	12.81	14.58	2.74	18.00	231.32
Louisiana	45.35	35.94	37.48	8.96	6.50	11.46	60.67	28.22	71.42	306.00
Maine	8.50	13.95	71.39	8.16	....	35.97	12.84	....	....	150.81
Maryland	1.00	....	....	25.60	....	3.75	20.23	13.29	....	63.87
Massachusetts	1.40	....	....	33.37	....	33.26	21.82	67.52	51.48	208.85
Michigan	201.99	51.05	71.39	166.20	40.16	64.65	116.65	8.14	16.99	737.22
Minnesota	91.07	12.94	53.37	50.93	31.94	23.18	32.91	....	42.28	338.62
Mississippi	24.10	33.50	85.57	....	....	....	....	37.45	15.48	196.10
Missouri	53.17	25.51	202.65	118.98	48.47	....	91.48	256.51	59.11	855.88
Montana	3.80	....	....	18.37	10.31	29.28	....	41.73	....	103.49
Nebraska	15.21	45.39	4.87	....	....	....	14.66	44.29	46.50	170.92
Nevada	....	....	26.27	0.31	....	....	214.71	2.20	31.30	274.79
New Hampshire	25.46	....	5.90	63.92	28.61	16.99	28.40	12.18	2.45	183.91
New Jersey	....	62.58	21.38	....	60.57	6.32	1.14	3.46	18.84	174.29
New Mexico	....	....	41.10	48.02	....	....	....	18.76	....	107.88
New York	58.32	4.14	30.82	30.58	57.00	29.33	201.12	51.19	60.69	523.19
North Carolina	22.24	53.10	18.50	10.00	11.39	25.17	53.82	....	62.34	256.56
North Dakota	....	....	....	....	16.36	....	3.56	....	....	19.92
Ohio	35.43	17.81	....	18.77	66.47	24.08	3.16	26.04	3.95	195.71
Oklahoma	....	9.24	79.01	....	8.60	15.95	108.87	222.97	11.39	456.03
Oregon	25.92	12.31	7.75	13.00	133.17	....	0.15	17.01	20.40	229.71
Pennsylvania	29.75	39.33	77.60	58.64	105.37	33.58	86.63	65.94	51.34	548.18
Rhode Island	....	....	....	....	....	16.33	0.58	0.48	....	17.39
South Carolina	44.05	....	1.54	76.50	25.00	15.80	8.60	13.50	24.97	209.96
South Dakota	....	....	24.04	26.65	16.43	....	23.33	....	120.98	211.43
Tennessee	74.01	39.81	41.23	64.15	54.84	47.94	2.60	53.44	20.49	398.51
Texas	107.10	188.82	126.13	77.81	39.12	44.63	23.96	118.83	75.16	801.57
Utah	19.71	3.05	16.19	....	....	6.88	14.70	66.03	....	126.56
Vermont	....	33.22	....	....	1.00	8.75	26.38	3.87	....	73.22
Virginia	112.89	51.69	4.80	21.74	....	4.45	47.46	0.66	38.55	282.24
Washington	16.36	55.86	12.01	88.35	12.69	10.44	30.10	8.83	13.20	247.84
West Virginia	1.36	77.49	26.08	12.13	21.10	8.85	....	14.29	29.69	190.99
Wisconsin	24.90	93.14	124.45	39.65	38.18	59.47	6.78	103.40	22.80	512.77
Wyoming	....	....	....	41.07	....	....	....	....	....	41.07
Total	1,452.07	1,875.66	1,995.00	1,842.95	1,522.84	1,139.60	1,896.96	1,783.03	1,299.28	14,807.39

Lines Abandoned in the United States and Canada in 1940

United States	Lines abandoned and taken up miles	Lines abandoned but not yet taken up miles
Alabama Central		
Manchester, Ala., to Sunlight	6.00	....
Ashland		
Pyriton, Ala., to Ashland	7.10	....
Atchison, Topeka & Santa Fe		
Blue Bell, Ariz., to Cordez	2.70	....
Atlantic Coast Line		
Union Jct., Ga., to Southover Jct.	0.99	....
At Pig Point, Va.	0.81	....
Baltimore & Ohio		
Durant City Jct., Pa.. to Durant City	1.60	....
Midvale, W. Va., to Adrian Jct.	....	12.00
Bennettsville & Cheraw		
Blenheim Jct., S. S., to Drake	....	3.31
Boston & Maine		
Franklin, N. H., to Franklin Falls Dam	2.45	....
Carlton & Coast		
Carlton, Ore., to Cody	....	20.40
Cairo, Truman & Southern		
Truman, Ark., to Weona	8.00	....
Arthur, Ark., to Arkansas Short Line Jct.	4.50	....
At Truman, Ark.	1.00	....
Central of Georgia		
McCombs, Ala., to Overton	7.30	....
Charlotte, Monroe & Columbia		
McBee, S. C., to Jefferson	....	17.16
Chesapeake & Ohio		
New Pittsburgh, Ohio, to Brush Fork Jct.	2.61	....
Ft. Monroe, Va., to Phoebus	....	0.65
Chicago & North Western		
Carroll, Iowa, to Manning	16.88	....
Alpha, Mich., to Crystal Falls	2.87	....
Clowry, Mich., to Wabik	0.72	....
At Antoine, Wis.	0.98	....
Ormsby Jct., Wis., to Ormsby	4.38	....
Strawbridge, Wis., to Hazel Green	....	5.08
Wanda, Minn., to Wabasso	....	5.58
At Hastings, Neb.	....	0.35
At Fremont, Neb.	....	3.67
Chicago, Burlington & Quincy		
Kasbeer, Ill., to Walnut	6.99	....
Greely Center, Neb., to Ericson	17.37	....
Ayr Jct., Neb., to Clay Center	25.11	....
Chicago, Milwaukee, St. Paul & Pacific		
Bradshaw, Ind., to Bridge Jct.	5.23	....
Mazomanie, Wis., to Prairie du Sac	0.92	....
Monroe, Wash., to Everett	13.20	....
Dixon, Iowa, to Oxford Jct.	22.72	....
Chicago, Rock Island & Pacific		
Cameron Jct., Mo., to Beverly	49.30	....
Elmira, Iowa, to Tipton	15.70	....
Bennett, Iowa, to Shaffton	34.71	....
Orion, Ill., to Rock Island	....	19.26
Copper Range		
Greenland Jct., Mich., to Greenland	2.30	....
Dansville & Mt. Morris		
Mt. Morris, N. Y., to Sonyea	2.35	....
Delaware & Hudson		
Plumadore, N. Y., to Saranac Lake	....	22.10
Due West		
Due West, S. C., to Donalds	4.50	....
East Berlin		
East Berlin, Pa., to Berlin Jct.	7.00	....
East Broad Top Railway & Coal		
Rocky Ridge, Pa., to Evanston	....	4.89
Neelyton, Pa., to Scranton	....	1.44
Erie		
Wanaque-Midvale, N. J.. to Ringwood	3.84	....
At Plains, Pa.	1.19	....
At Lisbon, Ohio	0.80	....
Great Northern		
At Sandstone Quarry, Minn.	2.61	....
Gulf, Colorado & Santa Fe		
Eldridge, Tex., to Bonus	5.81	....
Near Brady, Tex.	6.24	....
Huntingdon & Broad Top Mountain Railroad & Coal		
Near Huntingdon, Pa.	0.37	....
Illinois Central		
Brookhaven, Miss., to Gravel Pit	4.12	....
Kelso, Miss., to Spanish Fort	11.36	....
Kishacoquillas Valley		
Belleville, Pa., to Reedsville	9.20	....
Lehigh Valley		
Splash Dam, Pa., to Lopez	12.96	....
Little River		
Walland, Tenn., to Forks	11.00	....
Louisville & Nashville		
Morganfield, Ky., to Clay	18.00	....
Marcellus & Otisco Lake		
Marcellus, N. Y., to Otisco Lake	7.00	....
Michigan Central		
Harris, Mich., to Jackson	4.10	....
Minneapolis & St. Louis		
Conde, S. D., to Akaska	....	103.08
Minneapolis, St. Paul & Sault Ste. Marie		
Thief River Falls, Minn., to Goodrich	17.89	....
Glenwood City, Wis., to Cylon	11.44	....
Minnesota, Dakota & Western		
Nakoda Jct., Minn., to Loman	16.20	....
Missouri Pacific		
Joplin, Mo., to Grand Falls	1.12	....
Alix, Ark., to Coal Hill	4.18	....
Montana		
Montana Switch, Ark., to North Spadra	....	2.76
Mound City & Eastern		
Long Lake, S. D., to Leola	17.90	....
New York Central		
Hunter, N. Y., to Phoenicia	24.24	....
Wynn, Pa., to Mitchells	1.97	....
New York, New Haven & Hartford		
Berlin, Conn., to East Berlin	3.62	....
Stepney, Conn., to Trumbull	5.02	....
At Hartford, Conn. (Valley branch)	0.64	....
At Hartford, Conn. (Willimantic line)	0.22	....
Canaan, Conn., to East Canaan	2.33	....
Rynham, Mass., to Dean st.	2.63	....
West Hanover, Mass., to Hanover	5.20	....
Sterling Jct., Mass., to Sterling	2.07	....
Plymouth, Mass., to North Carver	7.52	....
Easton, Mass., to Eastondale	0.63	....
West Bridgewater, Mass., to Eastondale	3.50	....
Hopkinton, Mass., to Ashland	4.62	....
Dighton, Mass., to Somerset Jct.	3.24	....
Middleboro, Mass., to Myricks	6.42	....
Whitman, Mass., to East Bridgewater	3.31	....
Elmwood, Mass., to Stanley	1.15	....
Hobarts, Conn., to Brookfield Jct.	2.24	....
Winsted, Conn., to West Winsted	0.40	....
Bridgeport, Conn., to Stepney	....	2.41
Adamsdale, Mass., to Franklin Jct.	....	11.19
Norfolk Southern		
Suffolk, Va., to Edenton, N. C.	49.66	....
Beckford Jct., N. C., to Elizabeth City	21.46	....
Ouachita & North Western		
Clarks, La., to Gulf Crossing	24.00	....
Pacific Coast		
Sisquoc, Cal., to Palmer	4.00	....
Pennsylvania		
McCartney, Pa.	1.05	....
At Rehoboth, Del	0.88	....
Berwindale, Pa., to Mayes	1.93	....
Mahaffey, Pa., to Ostend	1.67	....
At Condron, Pa.	0.96	....
Newcomer, Pa., to Ache Jct.	2.58	....
At Rainey, Pa.	1.41	....
Pere Marquette		
Bay City, Mich., to end of line	....	7.00
Pittsburgh & Lake Erie		
Ellwood City Branch, Pa.	0.60	....
Reading		
Gilberton Station, Pa.	0.52	....
St. Louis-San Francisco		
Jacksboro, Tex., to Salesville	23.11	....
Caruthersville, Mo., to Grassy Bayou	6.41	....
Armorel, Ark., to Barfield	2.06	....
East Wilson, Ark., to Stoffle's Landing	1.52	....
Bentonville, Ark., to Grove, Okla.	41.01	....
At West Ridge, Ark.	0.03	....
St. Louis Southwestern		
Corsicana, Tex., to Hillsboro	40.00	....
Skaneatles		
Skaneatles Jct., N. Y., to Skaneatles	....	5.00
Southern		
Buffalo Jct., Va., to Buffalo Lithia Springs	3.89	....
Virgilina, N. C., to Holloway Mine	4.47	....
Shoulders Hill, Va., to Portsmouth	8.01	....
Emporia, Va., to Hitchcock Mills	8.34	....
Maryville, Tenn., to Walland	9.49	....
Southern Pacific		
Chino, Cal., to Ontario	4.80	....
Peters, Cal., to Milton	11.78	....
McKittrick, Cal., to Olig	2.00	....
Florence Jct., Ariz., to Florence	6.03	....
Southern New Jersey		
Barnegat, N. J., to Tuckerton	12.00	....
Manahawkin, N. J., to Hilliard	3.00	....
Texas & Pacific		
Torras, La., to Ferriday	....	47.42
Tonopah & Tidewater		
Crucero, Cal., to Beatty, Nev.	....	143.39
Virginia Blue Ridge		
Woodson, Va., to Lowesville	3.60	....
Western Maryland		
Georges Creek Jct., W. Va., to Midland Jct.	13.29	....
Elkins Jct., W. Va., to Norton	4.40	....
Western Pacific		
Calpine Jct., Cal., to Calpine	12.62	....
At Gulling, Cal.	1.43	....
Wheeling & Lake Erie		
At Cleveland, Ohio	0.54	....
	861.14	438.14
CANADA		
Canadian National		
Hampton, N. B., to St. Martins	28.45	....
Fortierville, P. Q., to St. Gregoire	27.25	....
Carbo, P. Q., to Cushing Jct.	24.60	....
Alvinston, Ont., to Kingscourt	9.82	....
Two Rivers, Ont., to Cache Lake	4.46	....
At Foothills, Alta.	0.14	....
At St. Catherines, Ont.	0.10	....
At Oshawa, Ont.	....	2.70
At St. Catherines, Ont.	....	0.35
Canadian Pacific		
Ste. Therese, P. Q., to St. Eustache	6.00	....
O'Donnell, Ont., to Gertrude	3.20	....
Vernon, B. C., to Okanagan Landing	4.23	....
	108.25	3.05

piers and docks; extensions and rearrangements of yards at eight points; the remodeling or rebuilding of 10 freight houses; improvements to engine terminals at six points; and the construction of passing sidings. It is worthy of note that whereas a large number of projects involving the reduction of curvature were either completed or under way during the year, only three projects involving grade reductions were reported. It should be pointed out that most of the revisions of alinement to reduce curvature were authorized for single curves or groups of curves, and that the individual expenditures were small but that the aggregate for this work was large. However, six of these projects were reported, each of which involved an expenditure of $100,000 or more.

As an indication that railway officers recognize how completely outmoded their stations have become, and that they are desirous of modernizing this facility, five roads reported projects of considerable magnitude for the construction of new stations or the remodeling of existing ones. Likewise, as an indication of the effect of larger locomotives and higher speeds, five projects were reported which involved expenditures of more than $100,000 each for the improvement of water stations.

The largest new-line project was that of the diversion of the Southern Pacific's line around the Shasta dam, between Delta, Cal., and Redding, 31 miles. This line is being built for the railway by the Bureau of Reclamation to bring the track above the level of the pool to be formed behind the dam. The construction of this line involves exceptionally heavy work, including a bridge more than 400 ft. above the present level of the Pitt river. Construction in Mexico has remained at a relatively low ebb although work has been prosecuted on several lines that have been under construction during the last two or three years. There is little prospect of a revival of construction activities as long as present economic and political conditions in the republic continue.

Abandonments Again Exceed 1,000 Miles

There was a considerable decrease in the mileage of lines abandoned during the year, the total being 1,299 miles compared with 1,783 in 1939. This is the tenth time since the record of abandonments was first compiled that they have exceeded 1,000 miles. The total

(*Continued on page 101*)

Railway Construction in the United States

(Figures in parenthesis indicate percentage of completion at the end of 1940.)

Aberdeen & Rockfish

Grade Crossing Elimination: Subway: Route 15A, Fayetteville, N. C., $54,000 (50).

Akron, Canton & Youngstown

Grade Crossing Elimination: Overcrossing: State Route 91, Akron, Ohio, $242,000 (100).

Alabama, Tennessee & Northern

Grade Crossing Elimination: Subway: York, Ala., $110,104 (100).

Alaska

Important Work Undertaken: Stores department warehouse, Anchorage, Alas., $148,000 (100). Replace timber trusses with steel trusses, Matanuska river crossing, Matanuska, $103,500 (100). Replace timber trusses with steel trusses, Indian river crossings, Canyon, $100,000 (50).

Alton

Grade Crossing Elimination: Overcrossings: Route 5, Normal, Ill., $146,021 (95). Route 77, Mazonia, Ill., $198,847 (100). Route 158, Pleasant Hill, Ill., $59,000 (100).
Subways: Route 4, Lincoln, Ill., $120,108 (100). Route 169, Springfield, Ill., $81,172 (100).

Alton & Southern

Grade Crossing Elimination: Subway: St. Clair Ave. and Route 12, East St. Louis, Ill., $250,000 (100).
Important Work Undertaken: Improvements to Engine Terminal, East St. Louis, Ill., $145,000 (60). 5,000,000-bu. grain elevator and storage tracks, East St. Louis, Ill., $556,885 (90).

Atchison, Topeka & Santa Fe

Second Track: D. T. Jct., Ariz., to Joseph City, 23.42 miles.
Grade Crossing Elimination: Overcrossings: Ottawa, Kan., (100). Clinton, Okla., (100). Raton, N. Mex., (100).
Subways: Huntingdon Dr., Arcadia, Calif., (50). Fremont Ave., Arroyo Seco Parkway, So. Pasadena, Cal., (50). Avenue 35., Arroyo Seco Parkway, Los Angeles, Cal., (50).
(Panhandle & Santa Fe) Overcrossing: Fifth St., Plainview, Tex., (100).
Important Work Undertaken: Line change, Mojave Gap, between Yucca, Ariz., and Haviland, (100). Renew bridge, San Onofre, Cal., (60). Line change and renewal of bridge, Red Rock, Okla., (75). Line change, 20 miles, Caddoa, Colo., account construction of government dam (100).

Atlanta & St. Andrews Bay

Grade Crossing Elimination: Subway: Cottondale, Fla., $100,000 (100).

Atlanta & West Point

Grade Crossing Elimination: Hawthorne Ave. closed to vehicular traffic, concrete stairways provided to approaches, College Park, Ga., $500 (100).

Atlanta, Birmingham & Coast

Grade Crossing Elimination: Overcrossings: Durand, Ga., $33,000 (50). Manchester, Ga., $116,500 (10). Warm Springs, Ga., $42,000 (30). Atlanta, Ga., $32,000 (30).
Subways: Junction City, Ga., $25,000 (100). Moultrie, Ga., $65,000 (35).

Atlantic Coast Line

Grade Crossing Elimination: Overcrossings: U. S. Route 76, Fair Bluff, N. C., $90,000 (100). State Route 20, Rex, N. C., $80,000 (100). State Route 95, Rocky Mount, N. C., $90,000 (100). U. S. Route 17, Chocowinity, N. C., $110,000 (40). Manning Ave., Sumter, S. C., $220,000 (100). Montgomery St., Savannah, Ga., $45,000 (100). State Route 21, Monteith, Ga., $55,000 (25). Route 13, Baldwin, Fla., $75,900 (100).
Subways: Harrison St., Hope Mills, N. C., $130,000 (100). U. S. Route 301, Wilson, N. C., $130,000 (100).
Reconstruction of Existing Grade Separation Structures: Third St., Ridgeland, S. C., $25,000 (100). U. S. Route 17, Ways, Ga., $95,440 (100). Carswell Ave., Waycross, Ga., $65,000 (Under Contract).

Baltimore & Ohio

Grade Crossing Elimination: Overcrossings: Leslie, Md., $130,000 (85). University, D. C., $250,000 (100). Columbia Center, Ohio, $215,000 (80). Mallett Creek, Ohio, $110,000 (100). Galatea, Ohio, $260,000 (90). Willow, Ohio, $425,000 (100). Carter Road, Cleveland, Ohio, $725,000 (100). Somerset, Pa., $115,000 (100).
Subways: Flemington, W. Va., $110,000 (85). Folsom, W. Va., $125,000 (40). Poast Town, Ohio, $295,000 (10). Marshall St., Youngstown, Ohio, $120,000 (100). Lorain, Ohio, $145,000 (100). Avilla, Ind., $90,000 (20). Richmond Valley, N. Y., $300,000 (100). Track elevation, Great Kills, S. I., N. Y., to Huguenot, $2,375,000 (100). Track elevation, Tottenville, N. Y., $1,200,000 (100). Archer Ave., Summit, Ill., $300,000 (100). Track elevation, Hopkins-Marilla St., Buffalo, N. Y., $200,000 (100). Chili Ave., Rochester, N. Y., $400,000 (90).
Relocation of Highways: Kenilworth, Md., $30,000 (100).
Reconstruction of Existing Grade Separation Structures: Akron, Ohio, $215,000 (100). Richmondale, Ohio, $140,000 (70).
Important Work Undertaken: New Pier, Locust Point, Baltimore, Md., $570,000 (100).

Belt Railway of Chicago

Grade Crossing Elimination: Subway: 75th St. and Damen Ave., Chicago, Ill., $90,250 (100).

Bessemer & Lake Erie

Grade Crossing Elimination: Subway: Greenville, Pa., $88,000 (100).

Birmingham Southern

Grade Crossing Elimination: Highway diversion to eliminate one crossing, Thomas, Ala., $4,500 (100).
Important Work Undertaken: Enlarging freight house and rearranging tracks, Birmingham, Ala., $140,000 (100).

Boston & Maine

Grade Crossing Elimination: Overcrossings: Hampstead Rd., Westville, N. H., $37,000 (100). Atkinson crossing, Atkinson, N. H., $78,000 (100). State and Furnace Sts., North Adams, Mass., $252,600 (40).
Important Work Undertaken: Revision of alinement to clear Birch Hill flood-control dam, 4.46 miles, Royalston, Mass., $1,000,000 (5).

Burlington-Rock Island

Grade Crossing Elimination: Subway: U. S. Route 75, Harris County, Tex., $93,000 (50).

Canadian National (Lines in United States)

Grade Crossing Elimination: Overcrossing: State trunk line M-100, Potterville, Mich. (100).
Subway: South Saginaw St., Flint, Mich. (to be completed in 1941).
Reconstruction of Existing Grade Separation Structures: Michigan Ave., Detroit, Mich. (to be completed in 1941).

Cape Fear

New Line Under Construction: Construction of spur track, Ft. Bragg, N. C., to Pope Field, 2 miles, to serve army base. (10).

Central of Georgia

Grade Crossing Elimination: Overcrossings: Hapeville, Ga., $90,574 (100). Cuthbert, Ga., $13,786 (100). Buchanan, Ga., $6,845 (100). Subways: Raymond, Ga., $27,090 (100). Bremen, Ga., $17,861 (100).
Important Work Undertaken: Replacing fertilizer storage warehouse destroyed by fire, Savannah, Ga., $103,302 (100).

Central of New Jersey

Grade Crossing Elimination: Overcrossing: Roosevelt Ave. over 4 tracks, West Carteret, N. J., $142,000 (100).

Charleston & Western Carolina

Grade Crossing Elimination: Subway: Martin, S. C., $45,000 (100).

Chesapeake & Ohio

Grade Crossing Elimination: Overcrossings: Shadwell, Va., $63,000 (100). Surveyor, W. Va., $35,245 (100). Riverton, Ky., $96,254 (100). Mt. Sterling, Ky., $115,000 (100).
Subways: Afton, Va., $57,800 (100). Paintsville, Ky., $76,370 (100). Coal Haven, Ky., $110,000 (100). Columbus, Ohio, $120,000 (100).
Reconstruction of Existing Grade Separation Structures: Afton, Va., $20,000 (100). Economy, Ind., $45,000 (100).
Important Work Undertaken: Home for hospital nurses, Clifton Forge, Va., $110,000 (100). Improvements to passenger station and paving east of station, Charleston, W. Va., $115,331 (100). Eight additional warehouses, Morrison, Va., $235,000 (100). Additional equipment and track for handling ore, Newport News, Va., $328,000 (100). Fill James River canal, Lynchburg, Va., $108,500 (55). Install crossovers and traffic locking on both main tracks, BS Cabin to Jerrys Run, Va., $117,000 (60). Additional unit to company hospital, Huntington, W. Va., $172,000 (1). Yard office building, underpass and tube system, Russell, Ky., $164,000 (100). Rearrange passing siding facilities, Ashland, Ky., to Netherland, $103,280 (100). Subdrainage, trench and rock backfill, Concord, Ky., $110,745 (30). Team tracks with viaduct connection, Cincinnati, Ohio, $232,198 (1). Improve coal sprinkling facilities on dumpers, Presque Isle, Ohio, $135,000 (2). Replace Calumet grain elevators, So. Chicago, Ill., $350,000 (100). Fill James River canal, rearrange tracks and pave driveways, Richmond, Va., $164,350 (9).
New Line Under Survey: Prestonsburg, Ky., to end of line, 10 miles.

Chicago & Illinois Midland

Grade Crossing Elimination: Overcrossing: 3 spans skew bridge, Petersburg, Ill., $77,855 (100).

Chicago & North Western

First Track: Clowry, Mich., to Johnson Siding, 5.00 miles. Johnson Siding, Mich., to Martin Landing, 0.23 mile.
Grade Crossing Elimination: Overcrossings: Route 19, Harvard, Ill., $80,000 (100). Construction of highway bridge to carry Route 31 over tracks, Radnor, Ill., $40,000 (100). Overhead highway bridge, including relocation of highway, Watersmeet Road, Crystall Falls, Mich., $100,000 (100). Overhead highway bridge to carry relocated Route 113, earth approaches, Lodi, Wis., $104,000 (100). Viaduct over tracks and Little Papillon Creek, State Route 38, Omaha, Neb., $43,500 (60). Viaduct on Elm St., U. S. Route 6, Hastings, Neb., $83,000 (50). Grade separation, Winnetka, Ill., involves track elevation and depression, 9 overhead bridges and 3 subways, $3,450,000 (85).
Subways: U. S. Route 139, Crystal Lake, Ill., $100,000 (95). State Route 61, Minnesota City, Minn., $67,740 (100). Rearrangement of yards and main track and construction of subway at Lake St., Sleepy Eye., Minn., $87,000 (100).
Important Work Undertaken: Construction of concrete highway bridge carrying Chase Ave. over double track freight line, Milwaukee, Wis., $120,000 (100). Improvements of locomotive shops, Chicago, Ill., $116,000 (100).

Chicago, Burlington & Quincy

Grade Crossing Elimination: Overcrossings: Neilson, Ill., $90,000 (100). Malvern, Iowa, $60,000 (100). Beverly, Mo., $100,000 (100). New Hampton, Mo., $50,000 (100).
Subways: Lockridge, Iowa, $55,000 (100). Brookfield, Mo., $300,000 (15). Casper, Wyo., $170,000 (70).

Chicago Great Western

Grade Crossing Elimination: Overcrossing: Knowlton, Iowa, $50,000 (100).
Subways: Including relocation and closing of existing grade crossing, Route 7, Lombard, Ill., $56,500 (100). Idaho St., Waterloo, Iowa, $50,000 (100).

Chicago, Milwaukee, St. Paul & Pacific

Second Track: River Junction, Minn., 0.78 mile.
Grade Crossing Elimination: Overcrossings: River bridge, Cass St., La Crosse, Wis., $75,000 (100). College Ave., Lake, Wis., $215,000 (75). Eau Claire, Wis., $100,000 (100). LaCrescent, Minn., $185,000 (100). Summit, S. D., $53,000 (100). U. S. Route 12, Milbank, S. D., $153,000 (25). Church St., Marvin, S. D., $65,000 (100). E. 38th St., Tacoma, Wash., $40,000 (100).
Subways: Austin Ave., Chicago, Ill., $900,000 (100). W. Lake Forest, Ill., $200,000 (40). Walworth, Wis., $75,000 (100). Crestwood, Wis., $110,000 (100). Wyocena, Wis., $70,000 (5). Fifth Ave., Mobridge, S. D., $60,000 (5). Loveland, Wash., $70,000 (100).
Relocation of Highways: Route 6, Dumont, Minn., to Granville, $87,500 (100). State Route 50, Wagner, S. D., to Lake Andes, $80,000 (20).
Reconstruction of Existing Grade Separation Structures: Central Ave., Chicago, Ill., $850,000 (80). U. S. 45, Franklin Park, Ill., $500,000 (70). Marion, Iowa, $75,000 (5). Worley, Idaho, $14,000 (3).
Important Work Undertaken: Reconstruct steel bridge over Little Soap creek, Brompton, Iowa, $108,442 (99). Building alterations and new equipment to permit moving general foundry to wheel foundry, Milwaukee, Wis., $113,599 (100). Construct l.c.l. station at Galewood Yard, including concrete platform 60 ft. by 1800 ft., Chicago, Ill., $472,785 (100).

Chicago, Rock Island & Pacific

Grade Crossing Elimination: Overcrossings: U. S. Route 69, Albert Lea, Minn., $35,000 (100). First St., Tucumcari, N. M., $218,000 (100). Main St., Greenwood, Mo., $200,000 (100). State Route 14, Clinton, Okla., $250,000 (100). U. S. Route 65, Little Rock, Ark., $270,000 (100). Illinois River, Peoria, Ill., $50,000 (10). State Route 261, Solon, Iowa, $46,000 (100).
Subways: Denrock Ave., joint with Ft. W. & D. C., Dalhart, Tex., $250,000 (100). Pine St., Dalhart, Tex., $86,000 (100). Earlsboro, Okla., $58,000 (100). U. S. Route 36, Fairview, Kan., $65,000 (100). May Ave., Oklahoma City, Okla., $137,000 (50).
Reconstruction of Existing Grade Separation Structures: Viaduct at Asher Ave. joint with Mo. P., Little Rock, Ark., $111,000 (100). Replacement of underpass with viaduct, Route 218, including realignment, Faribault, Minn., $114,000 (50). Underpass, Somers, Iowa., $35,000 (100). Viaduct 127th St., Blue Island, Ill., $495,000 (100).

Clinchfield

Grade Cross Elimination: Overcrossing: Harris, N. C., $38,000 (100).

Delaware & Hudson

Grade Crossing Elimination: Subway: Includes raising 3 existing bridges, Fort Edward, N. Y., $121,000 (100).

Delaware, Lackawanna & Western

Grade Crossing Elimination: Overcrossing: To eliminate grade crossing at Willow St., Johnson City, N. Y., (100).
Subways: Dansville-Geneseo Highway, Groveland, N. Y., (80). Union Road joint with Lehigh Valley and Erie, Cheektowaga, N. Y., (80). Bridge Road, Chenango Bridge, N. Y., (5). Track elevation to eliminate 21 grade crossings and to remove tracks from certain streets, Syracuse, N. Y., (40).
Reconstruction of Existing Grade Separation Structures: Widening of undercrossing because of expansion of State Route 6 into a dual highway, Mountain Lakes, N. J., (100). Relocation and reconstruction of overcrossing, Route 168, Tobyhanna, Pa. (100).

Denver & Rio Grande Western

Grade Crossing Elimination: Overcrossing: Dowd, Colo., $68,000 (100). Keeldar, Colo., $79,000 (100).
Important Work Undertaken: Installation of additional slag ballast, $127,350 (100).

Denver & Salt Lake

Second Track: Mile Post 5.43 Denver, Colo., to M. P. 7.15, 1.72 miles.

Detroit & Toledo Shore Line

Grade Crossing Elimination: Overcrossing: M. P. 6.69, Monroe County, Michigan (62).

Detroit Terminal

Grade Crossing Elimination: Subway to separate grades at Ford and Miller roads, Dearborn, Mich., $425,000 (40).

Duluth & Northeastern

Grade Crossing Elimination: Overcrossing: Cloquet, Minn., $60,000 (100).

Duluth, Missabe & Iron Range

Grade Crossing Elimination: Subway: Route 61, Thompson Hill, Duluth, Minn., $100,000 (to be completed in 1941).
Important Work Undertaken: Construction of engine terminal, Two Harbors, Minn., $150,000 (100).

Erie

Grade Crossing Elimination: Overcrossings: Wellsville-Andover State Route 5481, Andover, N. Y., (100). Elimination of Black Creek-Belfast joint with Pennsylvania, Rockville, N. Y., (100). W. Main St., Goshen, N. Y., (100). N. Broad St., Johnson City, N. Y., (40). Overhead crossing and relocation of tracks, W. Middlesex, Pa., (50).
Subways: Elimination of Union Rd. joint with Lehigh Valley and D. L. & W., Cheektowaga, N. Y., (80). Construction of subway and closing of 2 other crossings, Howells, N. Y., (100). Broadway St., Alden, N. Y., (100). Franklin Ave., Belwood Park, N. J., (100). Route 220, Shohola, Pa., (30). General street crossing elimination joint with New York Central, Dunkirk, N. Y., (40). State Route 31, Hamburg, N. Y., (20).
Reconstruction of Existing Grade Separation Structures: Bridge 3.32, Craigville, N. Y., (100).

Florida East Coast

Important Work Undertaken: Relocation of 250 ft. trestle and revision of track alignment across San Sebastian river, St. Augustine, Fla., $137,000 (85).

Galveston Wharf

Important Work Undertaken: Two piers and 2 pier houses, piers 11 and 12, with concrete firewalls, Galveston, Tex., $722,000 (100). Pier 34, Galveston, Tex., $106,608 (100).

Georgia

Grade Crossing Elimination: Relocation of Highways: Elimination of one crossing by street diversion, Conyers, Ga., $500 (100). Elimination of 2 crossings at Decatur, Ga., and one crossing at Clarkston by street diversions, $3,400 (100).

Georgia Northern

Grade Crossing Elimination: Overcrossing: Moultrie, Ga.

Great Northern

Grade Crossing Elimination: Overcrossings: Cloquet, Minn., $60,000 (100). Jackson St., St. Paul, Minn., $200,000 (100). Minneapolis, Minn.,

$50,000 (25). Bellingham, Wash., $100,000 (100). Mukilteo, Wash., $860 (100).

Subways: Robbinsdale, Minn., $140,000 (100). Devils Lake, N. D., $18,000 (100). Stanley, N. D., $25,000 (100). Ray, N. D., $111,276 (100). Dean, Wash., $40,990 (100).

Reconstruction of Existing Grade Separation Structures: Replace timber with steel beams and girders to overhead bridge, Minot, N. D., $30,000 (100). Replace overhead bridge, Louisiana Ave., Hopkins Jct., Minn., $10,300 (100). Replace timber approach with pipe culvert to overhead bridge, Lengby, Minn., $235 (100). Replace timber overhead bridge, Chisholm, Minn., $496 (100).

Important Work Undertaken: Widening banks and applying new ballast on 32 miles of main line, including 32 miles of new rail, and replacing rail on 7 passing sidings, New Rockford, N. D., to Wellsburg, $661,605 (100). Widening embankments and applying new ballast on 22 miles of main line, including the relaying of 22 miles of rail, extending and laying heavier rail on 4 passing sidings, Dodson, Mont., to Matador, $430,000 (100). Widen roadbed, Brook Park, Minn., to Coon Creek, $198,000 (25). Construction of intermediate terminal, Kettle Falls, Wash., $180,000 (25). Revision of alignment, Kettle Falls, Wash., $2,305,610 (25).

New Lines Under Construction: Kettle Falls, Wash., to Evans, 9.95 miles. Bossburg, Wash., to Williams, 5.28 miles. Kettle Falls, Wash., to Boyds, 12.65 miles.

Gulf Coast Lines

Important Work Undertaken: 6.2 mile line change, including 18,750 ft. of floodway bridge, Morganza Floodway, Krotz Springs, La., to Lottie, $2,500,000.

Houston Belt & Terminal

Grade Crossing Elimination: Overcrossing: Route 175, Houston, Tex., $100,000 (40).

Illinois Central

Grade Crossing Elimination: Overcrossings: Bloomington, Ill., $80,000 (100). Villa Park, Ill., $30,000 (80). Center Grove, Iowa, $100,000 (100). Martwick, Rockport, Ky., $97,250 (100). McComb, Miss., $84,000 (100). Jackson, Miss., $130,000 (100). Oxford, Miss., $63,500 (100). Mendenhall, Miss., $50,000 (100).

Subways: Cornish, Ill., $15,000 (100). Pinckneyville, Ill., $109,000 (85). Clinton, Ill., $50,000 (100). Mt. Pulaski, Ill., $50,000 (90). Greenwood, Miss., $125,000 (100). Camp Shelby, Miss., $48,000 (100).

Reconstruction of Existing Grade Separation Structures: Subway, Iola, Ill., $10,000 (100).

International-Great Northern

Grade Crossing Elimination: Overcrossing: Viaduct 1,354 ft. long, Kelly Field Loop, San Antonio, Tex., $161,800 (100).

Subways: Kilgore, Tex., $102,590 (100). Longview, Tex., $272,140 (100). Laredo, Tex., $126,119 (100).

Kansas City Southern

Important Work Undertaken: Replace bridge over Neches river, Beaumont, Tex., $435,055 (35).

Kentucky & Indiana Terminal

Grade Crossing Elimination: Subway: Seventh St., Louisville, Ky., (100).

Lehigh & New England

Grade Crossing Elimination: Overcrossings: State Route 23, over Lehigh & New England track and Papakating Creek, Sussex, N. J., $259,120 (50).

Lehigh Valley

Grade Crossing Elimination: Overcrossings: Alden-Crittenden road, Wende, N. Y., $96,000 (100). Comptown and Wyalusing roads, Wyalusing, Pa., $116,000 (100). Extension of Ridge road, West Seneca, N. Y., $161,000 (100).

Subway: Union road, Cheektowaga, N. Y., joint with Erie and D. L. & W., $500,000 (100).

Relocation of Highways: Elimination of Strattons & Todds crossings by relocation of Ithaca-W. Danby road and constructing overhead bridge, Newfield, N. Y., $180,000 (100).

Lowry Field

New Line Under Construction: At Denver, Colo., to reach site of army air corps technical school, 14 miles.

Louisville & Nashville

Grade Crossing Elimination: Overcrossings: Red Star, Ky., $25,000 (100). Mannington, Ky., $56,000 (100). Mortons, Ky., $50,000 (100). Falmouth, Ky., $70,496 (100). Adair St., Louisville, Ky., $300,000 (5). Fairmount, Ga., $44,000 (100). Adams, Tenn., $148,600 (100). Milligan, Fla., $60,000 (10).

Subways: Seventh & Magnolia, Louisville, Ky., $553,000 (100). Oliver Springs, Tenn., $29,271 (100). Springfield, Tenn., $31,200 (100). Trinity Lane, Tenn., $85,000 (10).

Important Work Undertaken: Enlargement of yard, and installation of car retarders and switch throwing machines, DeCoursey, Ky., $594,304 (100).

Maine Central

Grade Crossing Elimination: Overcrossing: Bartlett, N. H., $40,000 (100).

Minneapolis, St. Paul & Sault Ste. Marie

Grade Crossing Elimination: Overcrossings: Hamel, Minn., $75,000 (95). Stevens Point, Wis., $225,000 (100).

Subways: Wyndmere, N. D., $60,000 (started). Fessenden, N. D., $80,000 (100).

Important Work Undertaken: Grade revision, Siding 190, $164,000 (100).

Missouri-Kansas-Texas

Grade Crossing Elimination: Overcrossings: State Route 5, New Franklin, Mo., $224,710 (100). State Route 57, Erie, Kan., $75,000 (100). U. S. Route 70, Durant, Okla., $50,000 (100).

Subways: State Route 38, Kincaid, Kan., $75,000 (100). State Route 78, Leonard, Tex., $80,000 (65). Turney road, Dallas, Tex., $125,000 (95). State Route 246, Honey Springs, Tex., $75,000 (100). State Route 95, Granger, Tex., $75,000 (100). U. S. Route 77, Sterrett, Tex., $65,000 (100).

Relocation of Highways: Alvarado, Tex., to Grandview, $160,000 (100).

Reconstruction of Existing Grade Separation Structures: U. S. Route 69, Pryor, Okla., $60,000 (100).

Missouri Pacific

First Track: Eight miles, Tensinger Branch Jct., La., to Tensinger.

Grade Crossing Elimination: Overcrossings: U. S. Route 50, Greenwood, Mo., $160,000 (100). U. S. Route 50-N, Overbrook, Kan., $36,000 (100). U. S. Route 75-160, Independence, Kan., $168,800 (100). U. S. Route 71, Texarkana, Ark., $172,000 (85). U. S. Route 82, Montrose, Ark., $127,000 (started). State Route 1, Canaan, Ark., $84,000 (100). Asher Ave., Little Rock, Ark., $139,700 (100). U. S. Route 65, Natchez, Miss., $32,600 (100). U. S. Route 6, Hastings, Nebr., $300,000 (20).

Subways: U. S. Route 66, Chippewa St., St. Louis, Mo., $330,000 (100). State Route 30, Gravois Ave., St. Louis, Mo., $330,000 (15). U. S. Route 54, Batesville, Kan., $150,000 (5). State Route 10, Ft. Gibson, Okla., $60,000 (80). U. S. Route 65, Natchez, Miss., $40,000 (100).

Relocation of Highways: U. S. Route 64, Levesque, Ark., $220,000 (100). U. S. Route 165, Portland, Ark., to Wilmot, $130,000 (100). Standard, La., to Urania, $170,000 (100). Rochelle, La., to Lincecum, $160,000 (100). Route 9, Winnsboro, La., $135,000 (100).

Important Work Undertaken: Produce yard and viaduct over Grand Ave., construction of inspection and team tracks for handling perishable shipments, Kansas City, Mo., $1,063,000 (95). Construction of 1157 ft. incline and incline track, Natchez, Miss., $130,000 (100). Construction of new lead, etc., to serve new incline, Natchez, Miss., $182,000 (75).

Nashville, Chattanooga & St. Louis

Grade Crossing Elimination: Overcrossing: Cedar St., Murfreesboro, Tenn., $77,324 (100).

Subway: Willett St., Memphis, Tenn., $314,116 (100) joint with Union Railway.

Reconstruction of Existing Grade Separation Structures: Magnolia St., Atlanta, Ga., $92,582 (100), joint with Central of Georgia.

Nevada Northern

Grade Crossing Elimination: Overcrossing: Keystone, Nev., $75,000 (90).

New York Central

Grade Crossing Elimination: Overcrossings: New bridge and alterations to old bridge necessary account widening of Mosholus Parkway, Botanical Gardens, New York, N. Y., $180,500 (65). Dover Plains, N. Y., $262,000 (50). Skaneateles-Camillus State Route 897, Martisco, N. Y., $123,000 (30). Elimination of 13 grade crossings by carrying line over depressed grades of 7 highways and by construction of pedestrian subway at another, Dunkirk, N. Y., $3,000,000 (40). Powell Ave., Dock Junction, Pa., $233,300 (100). U. S. Route 30-S, Kenton, Ohio, $189,950 (75). U. S. Route 20, Rolling Prairie, Ind., $142,120 (40).

Subways: Depression of Railroad St. under tracks, and closing of Phelps St., Adams, N. Y., $150,100 (100). Depression of Union road under tracks and closing of Walden Ave., Forks, N. Y., $426,100 (100). State Route 5600, Irving, N. Y., $163,900 (70). Depression of Lake St. and closing of Pearl St., North East, Pa., $304,600 (10). State Route 55, Toledo (Vulcan), Ohio, $86,530 (100).

Relocation of Highways: Mansion St., Coxsackie, N. Y., $10,400 (100). Diversion of traffic to State Route 8028, closing two crossings, Lyons, N. Y., $21,700 (100).

Reconstruction of Existing Grade Separation Structures: 30th St. Yard, New York, N. Y., $5,964,000 (71). E. 163rd St. & 3rd Avenue, Melrose, New York, N. Y., $99,600 (100). Widening of pavement on reconstructed bridge, Croton Falls, N. Y., $314,500 (50). Catskill, N. Y., $78,400 (100). Canajoharie-Palatine bridge, Palatine Bridge, N. Y., $80,000 (100). Lafayette Ave., Suspension Bridge, N. Y., $10,100 (100). Orchard Park Rd., State Route 67, Bay View, N. Y., $107,900 (10). Blasdell, N. Y., $73,100 (30). Cemetery Rd., Erie, Pa., $138,700 (90). Maumee St., Adrian, Mich., $26,000 (100).

Important Work Undertaken: Alterations to ground floor of 466 Lexington Ave. Bldg., for store at corner of 45th St. and Lexington Ave., New York, $120,000 (100). Filling in and retiring bridge No. 74, Newburgh, N. Y., $190,000 (100). Strengthening bridges, raising tracks and revising approach signal distances, Weehawken, N. J., to Selkirk, N. Y., $390,000 (80). Raising bridge P-4 over New York State barge canal to increase clearance, Three River Point, N. Y., $156,000 (75).

(Boston & Albany) Overcrossing: Edwards Park Crossing, N. Y., $117,174 (100).

(Cleveland, Cincinnati, Chicago & St. Louis) Overcrossings: Sixth St., Cincinnati, Ohio, $750,000 (100). Fairfield, Ohio, $153,750 (100). Sherman Drive, Indianapolis, Ind., $180,000 (2).

Subway: Forest, Ohio, $100,000 (10).

(Michigan Central) Overcrossings: Military Ave., Dearborn, Mich., $270,000 (30). Court St., Saginaw, Mich., $450,000 (100).

Reconstruction of Existing Grade Separation Structures: Bridges over Michigan Ave. account widening street, Detroit, Mich., $1,370,000 (60).

(Pittsburgh & Lake Erie) Relocation of Highways: Relocation of 0.29 mile track, including construction of subway, Hillsville, Pa., $22,000 (100).

Important Work Undertaken: Extension to crane runway at steel car shop and installation of added machinery, McKees Rocks, Pa., $165,000 (100).

(West Shore) *Import Work Undertaken:* Bridge and signal revision for operation of heavier power, $380,000 (95).

New York, Chicago & St. Louis

Grade Crossing Elimination: Overcrossings: Cemetery Rd., Esmer, Pa., $223,906 (50). Powell Ave., Esmer, Pa., $193,326 (100). U. S. Route 20, Amboy, Ohio, $362,150 (50). Route 5, Bloomington, Ill., $66,000 (100).

Subways: State Route 30, Valparaiso, Ind., $128,862 (100). State Route 5600, Irving, N. Y., $375,000 (30). South Lake and Pearl Sts., North East, Pa., $222,391 (15).

Reconstruction of Existing Grade Separation Structures: Route 1,

Hoopeston, Ill., $40,000 (80). Brigham Rd. and Central Ave., Dunkirk, N. Y., $700,000 (5).

Important Work Undertaken: Construction of steel viaduct replacing frame trestle, Cowden, Ill., $157,919 (15). Lead track, scales, drainage and water lines at Calumet Yard, Chicago, Ill., $132,480 (40). Replacing steel viaduct, Conneaut, Ohio, $153,162 (100).

New York, New Haven & Hartford

Grade Crossing Elimination: Overcrossings: Elimination of 2 crossings, Wilton, Conn., $135,000 (100). Newington, Conn., $130,000 (100). Guilford, Conn., $140,000 (100). Chelmsford, Mass., $100,000 (50). Bridge to carry Hutchinson river parkway over railroad, Borough of Bronx, N. Y., $325,000 (40).

Subways: Hamden, Conn., $40,000 (100). Manchester Bridge, N. Y., $315,000 (80). Replacement of highway bridge by underpass, Brewster, N. Y., $250,000 (100).

Reconstruction of Existing Grade Separation Structures: Forgee Rd., E. Greenwich, Rhode Island, $147,000 (75).

Important Work Undertaken: Reconstruction of superstructures of 16 track bridges between Fairfield, Conn., and E. Norwalk, $550,000 (90). Two trestles 810 ft. long, Baychester, N. Y., $275,000 (35).

Norfolk & Western

Grade Crossing Elimination: Overcrossing: Barren Spring, Va., $141,300 (100).

Subways: Waynesboro, Va., $178,403 (5). Cedar Bluff, Va., $43,150 (5). Antietam, Md., $161,000 (100). Batavia, Ohio, $215,020 (30).

Relocation of Highways: Newtown, Ohio, $600 (100). Oakvale, W. Va., to Ada, $12,000 (100).

Reconstruction of Existing Grade Separation Structures: Widening the opening of subway, Petersburg, Va., $37,460 (5).

Important Work Undertaken: Construction of steel and concrete warehouse, Norfolk, Va., $721,000 (5). Extension of yard, Roanoke, Va., $4,700,000 (5). Water treating plant, tanks, etc., Bluefield, W. Va., $91,000 (10). Warehouse facilities, Portlock yard, Norfolk, Va., $140,000 (100). Construction of 1100 car classification yard and 200 car repair yard, Lamberts Point, Norfolk, Va., $530,000 (100). Double track steel viaduct, Maybeury, W. Va., $200,000 (100). 2.2 mile extension to Middle track, Hull, W. Va., $350,000 (100). New freight car paint yard, Roanoke, Va., $177,540 (100). Flood defense, Ironton, Ohio, $203,000 (40).

Norfolk Southern

Grade Crossing Elimination: Overcrossing: To carry U. S. Route 17 over N. S. and A. C. L. tracks, Porter Jct., N. C., $110,000 (25).

Subway: To carry U. S. Route 301 under N. S. tracks, Wilson, N. C., $47,000 (100).

Reconstruction of Existing Grade Separation Structures: Widening of overpass on U. S. Route 220, Star, N. C., $40,000 (30).

Northern Pacific

Grade Crossing Elimination: Overcrossings: Cloquet, Minn., $98,000 (100). Two viaducts, Butte, Mont., $190,500 (100). Manhattan, Mont., $69,000 (50). Elma, Wash., $62,250 (100). Castle Rock, Wash., $120,700 (100).

Subways: Smithville, Minn., $59,830 (100). Bismarck, N. D., $243,250 (100). Sixth Ave., Seattle, Wash., $65,000 (100). Factoria, Wash., $109,600 (100). Issaquah, Wash., $33,500 (100).

Important Work Undertaken: Grade raise and line change because of construction of diversion dam, Lombard, Mont., $159,000 (100). Stucco combination depot, 40 ft. by 160 ft., Carmens service buildings, grain inspection, switchmen and engineer buildings, platforms, signal and track changes, etc., Pasco, Wash., $184,000 (100). Redrive piling, repairs and improvements to Piers 1 and 2, remodel buildings and provide additional facilities for Alaska Steamship Co., Seattle, Wash., $192,500 (100).

Oklahoma City Junction

First Track: Oklahoma City, Okla., 0.05 mile.

Oregon, California & Eastern

Important Work Undertaken: Bank widening, ballasting, extension of switchbacks and reinforcement of 20 bridges, Klamath Falls, Ore., to Bly, $136,000 (85).

Pennsylvania

Grade Crossing Elimination: Overcrossings: Elkton, Md., (100). Track elevation to 8400 ft. to eliminate 5 crossings, Woodbridge, N. J., (100). Seaford, Dela., (45). Elimination of 2 crossings including diversion of highway, Stanley, N. Y., (20). State Route 16, Columbia Center, Ohio, (90). State Route 238, West Middlesex, Pa., (45). Black Creek-Belfast State Route 8311, Rockville, N. Y., (100). Orchard Park Rd., State Route 240, West Seneca, N. Y., (2). State Route 117, Hogsett Cut, Pa., (10). State Route 89, Garland, Pa., (85). U. S. Route 6, Hobart, Ind., (100). Route 1, Marshall, Ill., (100). State Route 501, Chestline, Ohio, (100).

Subways: State Route 370, Philadelphia Rd., Ohio, (50). Central Ave. and Brigham Rd., Dunkirk, N. Y., (10). Farnham-Irving State Route 5600, Irving, N. Y., (50). Chili Ave., Rochester, N. Y., (90). Jamison-East Elma State Route 925, Jamison Rd., N. Y., (55). State Route 04102 and relocation of Route 51, Enon, Pa., (25). U. S. Route 30, Valparaiso, Ind., (100). Dublin Rd., State Route 910, Marble Cliff, Ohio, (100). State Route 131, Fife Lake, Mich., (100).

Relocation of Highways: Emigsville, Pa., (100). Wyoming, Del., (100). Thorndale, Pa., to Gallagherville, includes pedestrian tunnel, (100).

Reconstruction of Existing Grade Separation Structures: Undergrade bridge, Ontelaunee, Pa., (100). Overhead bridge, Harrisburg, Pa., (100). 49th St. and Kingsessing Ave. bridges, Philadelphia, Pa., (25). Chartiers Ave. overhead bridge including rearrangement of station facilities, Corliss Station, Pittsburgh, Pa., (100). State Route 9218 overhead bridge, Ebenezer, N. Y., (30). State Route 47 undergrade bridge, Duncansville, Pa., (35). State Route 77 undergrade bridge, Morado, Pa., (10). High School road overhead bridge, Ben Davis, Ind., (100). Undercrossing, State Route 8, Milford, Ohio, (100).

Important Work Undertaken: Relocation of tracks on account of Municipal Airport, Philadelphia, Pa., (82). Philadelphia Terminal improvements, Philadelphia, Pa., (89). Change of line, Dillerville, Pa., (100). Revision of alignment to eliminate reverse curve, Garfield, Ohio, (60). New coaling station, 28th St., Pittsburgh, Pa., (100). Track elevation of River Bridge to Breckenridge St. and to L. & N. at 11th and Maple Sts., 1.6 miles to eliminate 10 streets; including extension of Portland Ave. freight house and team track facilities, Louisville, Ky., (100). Renewal of coal wharf and track changes, St. Clair Ave., Columbus, Ohio, (100). Spur to plant of Wright Aeronautical Corp., including yard facilities, Reading, Ohio, (75).

(Long Island) Overcrossings: Track elevation to eliminate 40 crossings; includes 5 miles of viaduct construction, Rockaway Beach, L. I., (40). Track elevation to eliminate 3 grade crossings, Aqueduct, L. I., (100). Elimination of 21 grade crossings, Atlantic Ave., by extension of subway, 4.5 miles, Brooklyn & Queens, (15). Elimination of grade crossing, Quoque-Riverhead Rd., Quoque, L. I., (100). Elimination of grade crossing, Medford Rd., Medford, L. I., (100).

Subway: Belt Parkway, Belmont Park, L. I., (100).

Reconstruction of Existing Grade Separation Structures: Replacement of Collins Ave. bridge, Fresh Pond, L. I., (100). Replacement of Roslyn Rd. bridge, Roslyn, L. I., (100).

The approximate total cost of foregoing projects is $114,963,350.

Pennsylvania-Reading Seashore Lines

Grade Crossing Eliminations Overcrossings: Tilton Rd., Germania, N. J., (100). State Route 49, including closing of an adjacent grade crossing, South Dennis Township, Cape May Co., N. J., (90). Franklin Ave., West Berlin, N. J., including reconstruction of overcrossing (15).

Subway: Elimination of 7 crossings, including relocation of 3.25 miles of double track, Absecon, N. J., (100).

Reconstruction of Existing Grade Separation Structures: State Route 51, Bridgeport, N. J., (100).

Pere Marquette

Grade Crossing Elimination: Subways: U. S. Route 20, Springville, Ind., $45,000 (100). U. S. Route 10, Grand Blanc, Mich., $350,000 (100).

St. Louis & O'Fallon

Grade Crossing Elimination: Overcrossing: Route 12, St. Clair Ave., near 45th St., East St. Louis, Ill., (100).

St. Louis-San Francisco

Grade Crossing Elimination: Overcrossings: U. S. Route 160, Lamar, Mo., $90,000 (100). Seventh St., State Route 14, Joplin, Mo., $354,893 (100). State Routes 45 and 27, Ellsworth, Kan., $26,096 (100). U. S. Route 60, White Oak, Okla., $23,000 (100). State Route 5, Kimbrough, Ala., $15,100 (100). State Route 7, Holly Springs, Miss., $76,000 (50).

Subways: Third Ave., State Route 299, Durant, Okla., $60,000 (100). U. S. Route 75, Henryetta, Okla., $85,000 (100). U. S. Route 61, Turrell, Ark., $144,200 (100).

Reconstruction of Existing Grade Separation Structures: Overcrossing replaces inadequate structure, State Route SH, Willow Springs, Mo., $50,000 (100).

Important Work Undertaken: New lines under construction account of Denison dam, Ravia, Okla., to Randolph, 3.1 miles; Liggett, Okla., to Platter, 11.6 miles; and Mead, Okla., to Lakeside, 4.1 miles. (To be completed in 1941).

St. Louis Southwestern

Grade Crossing Elimination: Subways: Buckner, Ark., $35,000 (100). Texarkana, Ark., $100,000 (100). Dallas, Tex., $250,000 (100).

Relocation of Highways: Eliminate two grade crossings, Redwater, Tex., to Maud, $120,000 (100).

San Francisco & Napa Valley

Important Work Undertaken: New enginehouse and yard layout, Napa Jct., Calif., to serve Mare Island navy yard, (100).

Savannah & Atlanta

Grade Crossing Elimination: Overcrossing: Ogeechee St., State Route 73, Sylvania, Ga., $125,000 (40).

Subway: State Route 80, Stapleton, Ga., $45,000 (100).

Important Work Undertaken: Relocation and grade reduction, M. P. 58 to M. P. 64, $140,000 (100). Relocation of line between M. P. 97¼ and M. P. 111, Torbit, Ga., $285,000 (100). Construction of storehouse and masonry walls to shop buildings, Savannah, Ga., $40,000 (95).

Seaboard Air Line

Grade Crossing Elimination: Overcrossing: Elimination, Athens, Ga., to Tallassee, (100).

Subways: Apex, N. C., (100). Abbeville, S. C., (100).

Reconstruction of Existing Grade Separation Structures: Dinwiddie, Va., (100). Calhoun Falls, S. C., (100). Bolton, Ga., to Moores Mill Road, (100). Hiram, Ga., (100). Buchanan Rd., Dallas, Ga., (100).

Southern

Grade Crossing Elimination: Overcrossings: Blairs, Va., $47,000 (100). Riverton, Va., $182,500 (10). Gate City, Va., $25,000 (100). Crutchfield, N. C., $38,000 (100). Icard, N. C., $85,000 (100). Lowell, N. C., $50,000 (100). Seneca, S. C., $31,500 (100). Converse, S. C., $54,000 (100). Fort Mill, S. C., $25,000 (100). St. Joseph St., Mobile, Ala., $211,000 (100). Hiram, Ga., $49,390 (100). Surrency, Ga., $50,000 (100). Oakland City, Ind., $59,200 (100).

Subways: Clarksville, Va., $33,126 (100). Barboursville, Va., $59,282 (50). Catherine, Ala., $30,000 (100). Irondale, Ala., $30,000 (100). Taylorsville Rd., Jeffersontown, Ky., $86,200 (50).

Relocation of Highways: Everett City, Ga., $80,120 (100).

(Alabama Great Southern) Subway: Irondale, Ala., $46,000 (100).

(Georgia Southern & Florida) Overcrossing: Sofkee, Ga., $44,800 (80).

(New Orleans & Northeastern) Subways: Poplarville, Miss., $89,400 (100). Pedestrian subway, New Orleans, La., $7,200 (100).

Southern Pacific

Grade Crossing Elimination: Overcrossings: Weed, Cal., $50,000 (100). Pomona, Cal., $145,238 (100). Turlock, Cal., $329,951 (100). Albany, Ore., $230,370 (100). Tigard, Ore., $28,654 (90). Tucumcari, N. M., $172,524 (100).

Subways: New highway location near Davis, Cal., $230,000 (60). Polhemus St., San Jose, Cal., $50,000 (100). University Ave., Palo Alto, Cal., $400,000 (100). Strassel, Ore., $32,000 (80). Central Ave., Phoenix, Ariz., $274,650 (100). Luzena, Ariz., $70,000 (100). Mesa, Ariz., $134,735 (20). Wyoming St., El Paso, Tex., $115,000 (100).

Important Work Undertaken: Reconstruction and rearrangement of station facilities, including buildings and tracks, to permit the construction of subway at University Ave., Palo Alto, Cal., $280,519 (100). Construction of new station with platforms and curbs, combination freight and passenger, Alhambra, Cal., $76,000 (100). Construction of new sta-

tion with platforms and curbs, combination freight and passenger, Pomona, Cal., $52,000 (100). Construction of new open deck bridge, including line change to facilitate construction and to fit into an ultimate development to reduce curvature, replacing lighter bridge over Pajaro River, Chittenden, Cal., $171,000 (80). Construction of concrete sea wall to prevent erosion by ocean along Coast Line, including repairs to walls previously constructed, San Francisco, Cal., to Los Angeles, $226,000 (80). Lengthening of sidings to accommodate longer trains, at Camarillo, Cal., Bloomington, Loma Linda, Ordway, Palm Springs, Garnet and Edom, $100,000 (100). Improvements to water stations at Nogal Lake, N. M., Alamogordo, Lower Juniper, Tucumcari, Three Rivers, Bonito Reservoir, Nannie Baird, etc., $125,435 (100). Installation of 13 water softening plants at various points, $116,000.

New Line Under Construction: Redding, Cal., to Delta, 30.09 miles.

Southern Pacific (Lines in Texas and Louisiana)

Grade Crossing Elimination: Overcrossings: Nacogdoches, Tex., $204,000 (100). Kelly Field, Tex., $194,000 (100). Avondale, La., $140,000 (80). Elgin, Tex., $131,000 (10). Keithville, La., $150,000 (started).

Subways: Jensen Drive, Houston, Tex., $145,000 (100). Normanna, Tex., $145,000 (100). Burton, Tex., $85,000 (60). Flatonia, Tex., $100,000 (started). Cuero, Tex., $80,000 (started). Lufkin, Tex., $202,000 (started).

Relocation of Highways: Sunset, La., $250,000 (started). Giddings, Tex., $82,000 (60). Mexia, Tex., $94,000 (70). Elgin, Tex., $135,000 (5).

Important Work Undertaken: Renewal of Neches River Bridge, Beaumont, Tex., $390,000 (100). Construction of bridge over Wax Lake outlet, Calumet, La., $1,100,000 (35). Construction of double track swing bridge over Charenton drainage and navigation canal, Baldwin, La., $500,000 (35).

Spokane, Portland & Seattle

Grade Crossing Elimination: Overcrossing: Tigard, Ore. (100).

Subway: Third Ave., Bend, Ore., $75,000 (100).

Important Work Undertaken: Addition of 500,000 bu. capacity to grain elevator, Vancouver, Wash., $100,000 (100).

Tennessee

First Track: Campbell County, Tenn., 4 miles, $100,000 (100).

Tennessee Central

Grade Crossing Elimination: Subway: Nashville, Tenn., $28,000 (5).

Reconstruction of Existing Grade Separation Structures: Replacing wooden structure of underpass with concrete abutments and girder span, Nashville, Tenn., $38,000 (100).

Terminal R.R. Ass'n. of St. Louis

Important Work Undertaken: Replacing interlocking tower and equipment destroyed by fire, Interlocking Tower 1, Union Station, St. Louis, Mo., $300,000 (100).

Texas & Pacific

Grade Crossing Elimination: Overcrossings: Lobdell, La., $193,000 (85). Mansfield, La., $300,000 (80). Avondale, La., $300,000 (70).

Subways: Baird, Tex., $114,000 (100). Handley, Tex., $110,000 (100). Fifth St., Longview, Tex., $272,000 (100).

Important Work Undertaken: Construction of brick passenger station, subway and train shed, Longview, Tex., $175,000 (100). Remodel passenger station and construct subways and train shed, Marshall, Tex., $150,000 (100). New passenger station and train shed facilities, Shreveport, La., $200,000 (50).

Toledo, Angola & Western

Grade Crossing Elimination: Overcrossing: State Route 55, Secor Rd., Toledo, Ohio, $250,000 (100).

Union

Grade Crossing Elimination: Subways: Willett St., Memphis, Tenn., $190,000 (100).

Union Pacific

First Track: Prince Jct., Nev., to Prince, 8.71 miles.

Grade Crossing Elimination: Overcrossings: Elm St., Hastings, Neb., $90,000 (20). Route 92, Clarks, Neb., $75,000 (100). A St., Rock Springs, Wyo., $140,000 (100). U. S. Route 91, Glendale, Nev., $25,300 (10). Aliso St., Los Angeles, Cal., $3,654,000 (20).

Subways: Chestnut St., Kimball, Neb., $105,000 (100). M St., Rock Springs, Wyo., $125,000 (100). Mountain Home, Wyo., $10,000 (30). 46th Ave., Denver, Colo., $277,000 (100). U. S. Route 191, Rigby, Idaho, $100,000 (100). Main St., Nyssa, Ore., $190,000 (20). State Route 205, So. Pasadena, Cal., $113,550 (100). Arroya Seco Parkway, Los Angeles, Cal., $197,700 (100).

Important Work Undertaken: Construction of trackage and roadway for team and yard tracks in connection with food terminal, Kansas City, Kan., $605,800 (70). Construction of 2 concrete piers and 2 concrete abutments, replacing pile piers and abutments, Manhattan, Kan., $112,000 (100). Purchase of land and construction of trackage, buildings, paving, etc., for Denver Food Terminal Market, Denver, Colo., $1,200,000 (100). Purchase of land and construction of 125 ft. by 200 ft. warehouse and garage, Denver, Colo., $110,000 (50). Strengthen bridge and replace floor of viaduct, 16th St., Omaha, Neb., $105,000 (100). Additional facilities at Food Terminal, Denver, Colo., $365,600 (50). Construction of 251 ft. long bridge replacing trestle, Pasadena, Cal., $100,000 (100).

United States Army

Important Work Undertaken: Construction of 16.1 miles of track, Savanna Ordnance Depot, Savanna, Ill.

Virginian

Grade Crossing Elimination: Relocation of Highways: Elimination of crossing, Fayette County, W. Va., $13,400 (100). Elimination of crossing by construction of new road, Fayette County, W. Va., (100). Elimination of crossing by construction of new road, White Oak, W. Va., (100).

New Line Under Survey: Extensions to Huff Creek, W. Va., and Cub Creek Branches 17.82 miles.

Wabash

Grade Crossing Elimination: Overcrossings: Route 135, Monticello, Ill., $100,000 (100). Route 132, Mitchell, Ill., $75,000 (100).

Subways: Pelham Rd., Hand, Mich., $125,000 (100). 79th St. and Kedzie Ave., Chicago, Ill., $800,000 (100). Damen Ave., Chicago, Ill., $565,000 (100). Skinker Blvd., St. Louis, Mo., $400,000 (5).

Reconstruction of Existing Grade Separation Structures: Undercrossing at Mannheim Rd., U. S. Route 45, Orland Park, Ill., $100,000 (90). Undercrossing for Oak St., Orland Park, Ill., $10,000 (100). Undercrossing for State Route 4, Maryville, Mo., $50,000 (100).

Western Maryland

Grade Crossing Elimination: Subway: Elizabeth St., Hagerstown, Md., $110,000 (100).

Important Work Undertaken: 115-ft. turntable and extension to enginehouse, Hagerstown, Md., $225,000 (100). 115-ft. turntable and extension to enginehouse, Cumberland, Md., $160,000 (100).

Wheeling & Lake Erie

Important Work Undertaken: Construction of new yard facilities and repair tracks, Cleveland, Ohio, $158,193 (100).

Wichita Falls & Southern

Grade Crossing Elimination: Overcrossing: Lake Wichita, Tex., $67,000 (100).

Railway Construction in Canada

Canadian National

First Track: Line revision near Kakabeka Falls, Ont., 0.97 mile.

Second Track: Truro, Nova Scotia, 2.00 miles.

Grade Crossing Elimination: Overcrossings: Including relocation of highway, Mile 103.1, Priceville, Que., (100). Including relocation of Don Mills road, Mile 10.28, Bala Sd., Ont., (100).

Subways: St. Anne, Laframboise and Bourdages Sts., St. Hyacinthe, Que., (to be completed in 1941). Montreal-St. Anne de Bellevue highway, Dorval, Que., (to be completed in 1941). To carry railway on Niagara St. over Toronto-Fort Erie highway, St. Catharines, Ont. (100). To carry railway over Toronto-Fort Erie highway, Mile 2.12, Grantham near St. Catharines, Ont. (100). To carry railway and Martindale road over Toronto-Fort Erie highway, Mile 21.53, Port Dalhausie Sd., Ont. (100).

Relocation of Highways: Eliminating two highway grade crossings, Mile 88.75 and 90.26 Alderdale Sd., Ont. (100). Elimination of grade crossing, Saskatoon, Sask. (100).

Reconstruction of Existing Grade Separation Structures: Overhead bridge, Mile 84.4, Sussex Sd., Brookville, N. B. (100). Overhead bridge, Mile 76.6, Blair Siding, N. B. (100). Subway over Quebec Highway No. 2, Soulanges, Que. (100). Overhead bridge, Mile 6.70, Strathroy Sd., Ont. (100). Subway, Mile 52.06, Chatham Sd. near Northwood, Ont. (100).

Important Work Undertaken: New engine facilities, Fairview, Halifax, N. S. (to be completed in 1941). Construction of additional sidings, rearrange switching leads and overhead bridge across the yard, Truro, N. S., (100). Rearrangement and extension of yard and passing sidings, between New Glasgow, N. S. and Sydney (100). Extension of freight yard, Moncton, N. B. (100). Locomotive erecting shop, Moncton, N. B. (to be completed in 1941). Construction of additional sidings and lengthening existing sidings, etc., between Pacific Jct., N. B. and Halifax, N. S. (100). Yard extension, Turcot, P. Q. (to be completed in 1941). Reconstruction of bridge over Kaministiquia River, Kakabeka Falls Mile 23.6, Man. (to be completed in 1941). Repairs and modernization of 4 stationary boilers in powerhouse, Transcona, Man. (100). New office building, corner of Portage Ave. and Main St., Winnipeg, Man. (to be completed in 1941). New passenger station, Saskatoon, Sask. (100). New boiler house, steam generating plant and pipe tunnel, Saskatoon, Sask. (100). New terminal facilities, Montreal, P. Q. (under construction).

Canadian Pacific

Important Work Undertaken: 54 Miles rock ballast, Kaministiquia subdivision, $815,000 (100). 52 miles bank widening, Kaministiquia subdivision, $195,000 (100). Installing new steam generators in power plant, Angus Shops, Montreal, Que., $250,000 (100).

Grand River

Second Track: Preston, Ont., 0.72 mile.

Newfoundland

Important Work Undertaken: Remodeling, reinforcing and renewal of main line bridges, St. John's to N. F., to Port aux Basques, $130,000 (75).

Toronto Hamilton & Buffalo

Grade Crossing Elimination: Reconstruction of Existing Grade Separation Structures: Dundurn St. overhead bridge, Hamilton, Ontario, $10,000, (100). Birch Ave. bridge, Hamilton, Ontario, $8,000 (100).

White Pass & Yukon

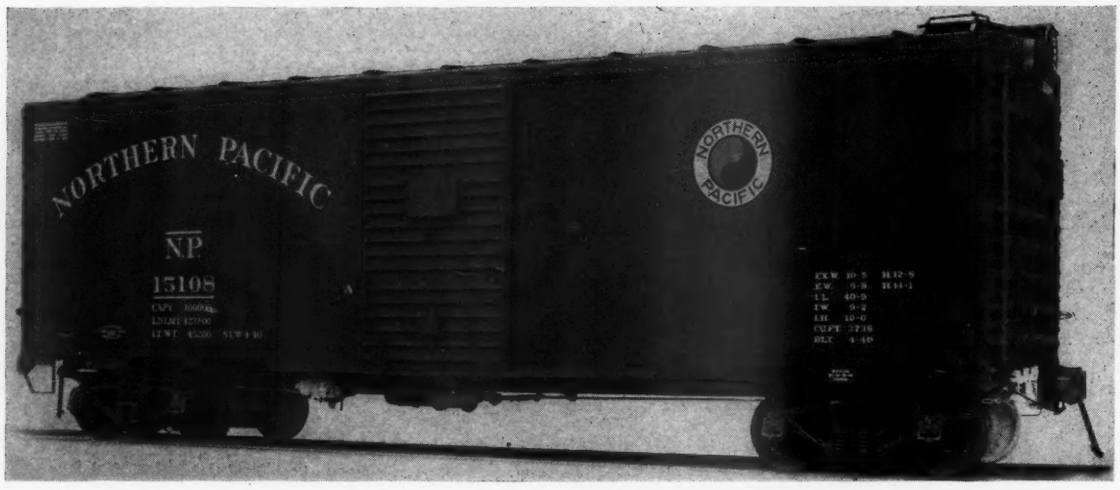
First Track: Line diversion, M. P. 82 to M. P. 83, Yukon territory, 1 mile.

Railway Construction in Mexico

National of Mexico

Grade Crossing Elimination: Viaduct over yard, Nonoalco, Mexico City (50).

Important Work Undertaken: Engine house, San Louis Potosi (75).



A 50-Ton Steel Box Car Built by the Pullman-Standard Manufacturing Company

Freight Cars Ordered in 1940

Domestic orders for 64,881 cars up 10,450 over last year; best export market since 1929

By Arthur J. McGinnis
Associate Editor

FREIGHT car orders placed in the United States for domestic service during 1940 totaled 64,881 cars, an increase of 10,450 cars or 19 per cent as compared with 1939. With the exception of 1936, orders placed in 1940 were the largest for any year since 1929. Following the trend of business and railroad earnings, purchases rose sharply during the closing months of the year, approximately 76 per cent of total cars ordered being placed in the last six months.

Table I—Freight Car Orders in 1940

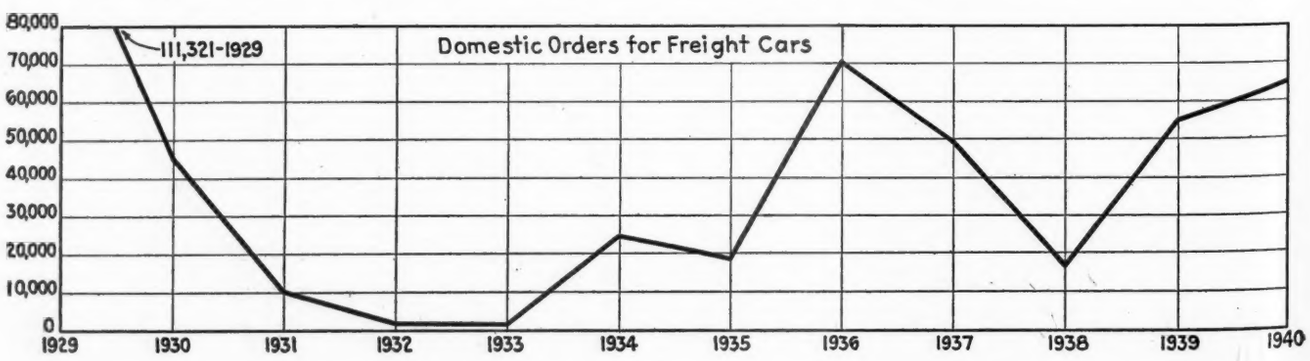
For service in the United States	64,881
For export from the United States	1,774
For service in Canada and export from Canada	936
Grand Total	67,591

Company shops received contracts for 12,475 cars, or 19 per cent of the total placed, which is about the same proportion as received last year. Large orders placed by the carriers with their own shops included 2,455 cars of various types (chiefly 2,100 gondola cars) and 200 cabooses by the Pennsylvania, 1,000 box and 100 hopper cars by the Baltimore & Ohio, 2,000 box cars and 25 cabooses by the Chicago, Milwaukee, St. Paul & Pacific, 2,250 box cars by the Union Pacific and 1,000 hopper cars and 50 cabooses by the Reading.

Table II—Orders for Freight Cars 1929-1940

Year	Domestic (A)	U. S. Export	Canadian	Total
1940	64,881	1,774	936	67,591
1939	54,431	1,476	7,007 (Inc. Exp.)	62,914
1938	16,647	442	4,902	21,991
1937	49,331	1,369	7,397	58,097
1936	70,842	526	271	71,639
1935	18,708	110	2,421	21,239
1934	24,610	1,323	12	25,945
1933	1,686	132	75	1,893
1932	1,968	77	501	2,546
1931	10,826	151	3,807	14,784
1930	45,731	1,200	1,936	48,867
1929	111,321	3,023	9,899	124,243

(A) In certain instances, domestic orders placed in December are not reported until following year. Statistics for years 1929-1939 have been revised to eliminate this overlap.



Large orders placed with builders included 4,005 cars by the Great Northern, 3,825 by the Louisville & Nashville, 3,321 by the Southern, 3,200 by the New York Central and 3,062 by the Illinois Central.

Foreign purchases placed with American builders totaled 1,774 cars, an increase of 298 cars as compared with last year and the largest volume of export orders booked since 1929. Large contracts placed included 500 air-dump cars for service in Russia, 500 box cars for the Royal State Railways of Siam and 458 cars of various types for Brazil. Canadian purchases during the year dropped to 936 cars, the smallest volume booked since 1936 and a decrease of 6071 under 1939.

Table III—Freight Cars Built 1929-1940

Year	Domestic	U. S. Export	Canadian	Total
1940	52,929	1,622	2,052	56,603
1939	24,876	181	2,206 (Inc. Exp.)	27,236
1938	17,473	549	5,115 (Inc. Exp.)	23,137
1937	75,003	1,121	6,595	82,719
1936	45,822	493	1,800	48,115
1935	6,933	888	801	8,622
1934	25,176	151	....	25,327
1933	2,160	151	550	2,861
1932	3,254	82	....	3,336
1931	13,205	409	4,633	18,247
1930	75,188	1,909	6,923	84,020
1929	82,240	3,168	8,557	93.965

Freight cars built in the United States for domestic service, as distinguished from cars ordered, totaled 52,929, more than double the 24,876 cars completed last year. Construction for export also increased—in line with the heavier volume of orders booked during 1939 and 1940—to 1622 cars, up 1,441 cars over last year. Canadian plants turned out 2052 cars.

The foregoing production figures should not be confused with the totals of orders placed. Nor are they comparable with the figures on the number of cars *installed* as reported in statistics issued by the A. A. R.

In comparing the volume of freight car purchases placed this year with earlier periods, the marked development and improvement in car construction that has taken place in recent years should be borne in mind. One of the most important features of this development has been the increase made in the carrying capacity of the average freight car. The greater unit capacity of the new cars as compared with old equipment retired gives them an effect on aggregate capacity considerably greater than is indicated by their number.

The appended tables contain a detailed statement of orders for new freight cars, or those having new bodies, placed during 1940 by railroads and industrial concerns; also those placed in Canada and for export. The list of orders was compiled from information furnished to the *Railway Age* by the railroads, private car lines, and other purchasers of cars in response to requests for this information. Data thus compiled were then checked with lists of orders supplied by the car builders, and also against weekly reports of orders appearing in the Equipment & Supplies column of the *Railway Age*. Production figures were secured in response to requests to car builders. As in former years, the *Railway Age* is especially indebted to the American Railway Car Institute for its assistance in making available reports of the companies affiliated with that organization.

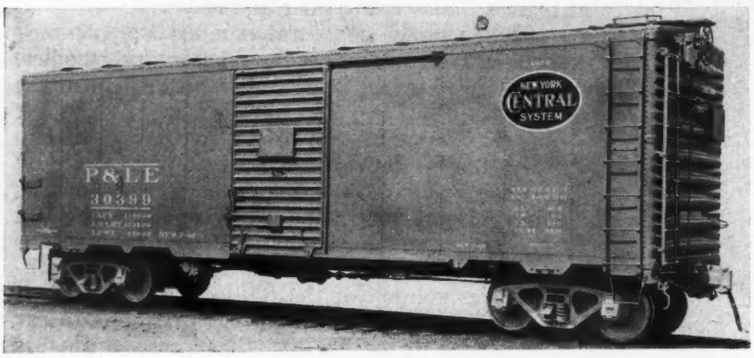
The *Railway Age* does not guarantee the listing of orders to be complete or the statistical accuracy of the production figures. However, it is believed that such omissions as occur will be found to be relatively small and unimportant, and will not vitiate the value of the figures, particularly with respect to comparisons with preceding years.

Freight Car Orders in 1940

For Service in the United States

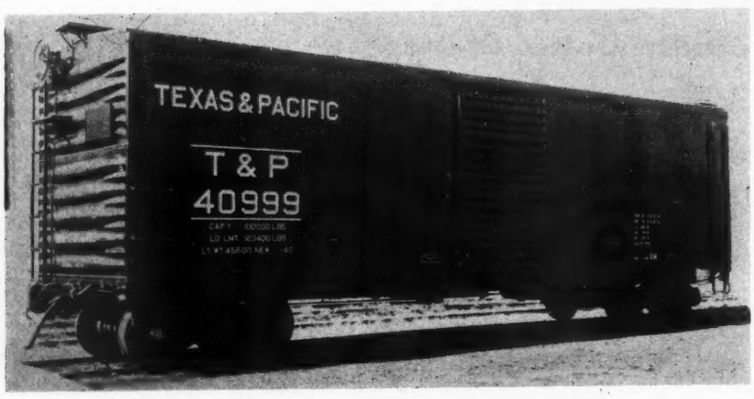
Purchaser	No.	Class	Capacity	Length ft.	Length in.	Construction	Weight	Date of order	Date of delivery	Builder
Alabama Great Southern	25	Cov. Hopper	140,000	29	3	Steel	51,400	May	August	Pullman-Standard
Alaska	20	S. S. Box	100,000	40	9	St. Underframe	....	August	December	Haffner-Thrall
Aliquippa & Southern	25	Gondola	200,000	38	2	Steel	59,000	September	Feb. '41	Company Shops
American Cyanamid Co.	1	Tank	10,000g	..	..	....	.....	September	December	General American
American Refrigerator Transit Co.	100	Refrigerator	80,000	33	2¾	Steel	53,000	October	Jan. '41	Company Shops
American Smelting & Refining Co.	1	Gondola	80,000	22	0	Steel Frame	31,000	February	May	Pac. Car & Fdy.
American Steel Foundries	2	Box	100,000	40	6	Steel	45,000	January	April	Pressed Steel
Ansul Chemical Co.	1	Tank	40,000	32	3	Steel	48,000	April	June	Amer. Car & Fdy.
Atchison, Topeka & Santa Fe	27	Ore	190,000	24	5	Steel	60,000	February	August	Pressed Steel
	50	Cov. Hopper	140,000	29	3	Steel	52,300	April	September	General American
	42	Flat	140,000	60	0	St. Underframe	64,400	July	September	General American
	200	Hopper	100,000	33	0	Steel Frame	41,500	October	Feb. '41	General American
	200	Gondola	100,000	48	6	Steel Frame	46,000	October	Feb. '41	General American
	50	Gondola	140,000	65	6	Steel Frame	59,700	October	Feb. '41	General American
	50	Flat	140,000	60	0	Steel Frame	64,500	October	Feb. '41	General American
	300	Rodger Ballast	140,000	40	8	Steel	55,200	October	Mar. '41	Amer. Car & Fdy.
	1	Box	100,000	40	6	Steel	49,000	March	June	Pullman-Standard
	2,010	D. S. Box	100,000	40	6	Steel	46,245	October	June '41	Pullman-Standard
Atlantic Coast Line	728	D.S.Auto-Box	100,000	40	6	Steel	53,100	September	Dec.-Feb. '41	Pullman-Standard
	15	Cov. Hopper	140,000	29	3	Steel	42,600	September	Dec. 1941	Pullman-Standard
	500	Hopper	100,000	30	11¾	Steel Frame	42,600	September	Nov.-Dec.	Bethlehem
	200	Gondola	100,000	41	6	Steel Frame	44,100	September	Nov.-Dec.	Bethlehem
	100	Phos. Hopper	140,000	35	9¾	Steel Frame	50,500	September	Nov.-Dec.	Bethlehem
	50	Stock	80,000	40	6	Steel Frame	42,200	September	Jan. '41	Mount Vernon
	100	S.S.Auto-Furn.	100,000	50	6	Steel Frame	57,400	September	Jan. '41	Mount Vernon
Ayrshire Patoka Collieries Corp.	5	Ore	100,000	28	5¾	Steel	.....	August	November	Amer. Car & Fdy.
Baltimore & Ohio	100	Cov. Hopper	140,000	26	3⅝	Steel	50,760	March	June-July	Company Shops
	1,000	D. S. Box	100,000	40	6	Steel	47,300	October	1941	Company Shops
	750	Gondola	140,000	52	6	Steel	56,400	October	Feb. '41	Amer. Car & Fdy.
	250	Gondola	140,000	65	6	Steel Frame	64,600	October	Feb. '41	Bethlehem
Barrett Co.	7	Tank	11,000g	42	7½	Steel	73,000	May	August	Amer. Car & Fdy.
	7	Tank	50,000	..	..	....	.....	May	August	General American
	10	Tank	11,000g	42	7½	Steel	71,000	September	November	Amer. Car & Fdy.
Bay Chemical Co., Inc.	1	Tank	8,000g	..	..	....	.....	February	March	General American
Belt Ry. Co. of Chicago	50	Hopper	100,000	33	0	Steel	40,400	June	July	Pullman-Standard
Berwind-White Coal Mining Co.	50	Hopper	100,000	31	3	Steel	41,300	May	Nov.-Dec.	Company Shops
Bessemer & Lake Erie	100	S. S. Box	100,000	40	6 9/16	Alloy Steel	42,000	June	Jan. '41	Amer. Car & Fdy.
	650	Hopper	180,000	40	8	Alloy Steel	48,700	November	1941	Pullman-Standard
	50	Flat	100,000	50	8	Alloy Steel	44,800	November	May-June '41	Magor
	20	Caboose	60,000	30	0	Alloy Steel	56,000	September	Feb. '41	Greenville
	300	D. S. Box	100,000	40	6	Alloy Steel	46,200	November	Feb. '41	Greenville
Bingham & Garfield	10	Air Dump	40 cu. yds.	35	10	Steel	78,600	March	October	Pressed Steel
California Dispatch Line	7	Tank	8,000g	39	1½	Steel	56,100	February	June	Amer. Car & Fdy.
	5	Tank	6,000g	41	0½	Steel	57,500	February	June	Amer. Car & Fdy.
	5	Tank	6,000g	33	4	Steel	49,000	February	June	Amer. Car & Fdy.

Hopper Car of 50-Ton Capacity Built for the Baltimore & Ohio by the Bethlehem Steel Company—It Has a Light Weight of 43,500 Lb.

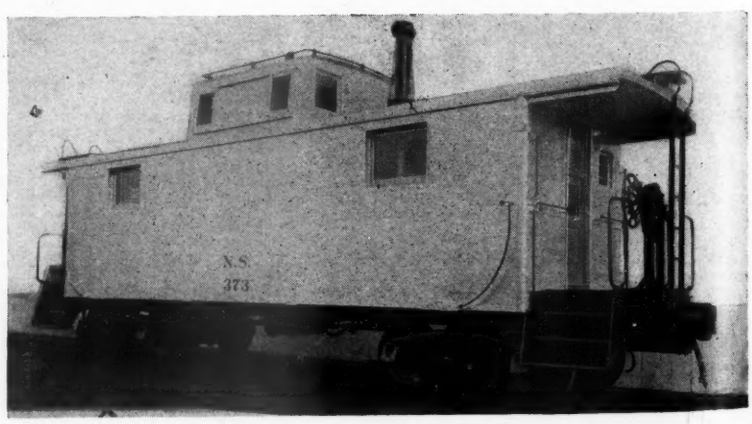


One of 500 Box Cars With a Capacity of 110,000 Lb. and a Light Weight of 45,900 Lb. Delivered to the P. & L. E. by the Pressed Steel Car Company

All-Steel Covered Hopper Car of 70-Ton Capacity Built for Cement Service—100 Were Ordered from the General American Transportation Corporation



This Box Car Built by the Mt. Vernon Car Manufacturing Company Has a Light Weight of 45,600 Lb.—The Inside Length is 40 Ft. 6 In.



An All-Steel Caboose Recently Built for the Norfolk Southern by the Magor Car Corporation

Purchaser	No.	Class	Capacity	Length ft.	Length in.	Construction	Weight	Date of order	Date of delivery	Builder
California Dispatch (Cont'd)...	10	Tank	8,000g	36	9½	Steel	47,200	February	June	Amer. Car & Fdy.
	5	Tank	8,000g	..	..	....	.....	March	July	General American
	10	Tank	6,000g	..	..	....	.....	March	June-July	General American
Cambria & Indiana	200	Hopper	100,000	33	0	Steel Frame	41,500	May	July-Aug.	Bethlehem
Carnegie-Illinois Steel Corp.....	1	Flat	500,000	87	6	....	385,800	September	Jan. '41	Greenville
	2	Flat	200,000	45	0	Steel	56,000	October	1941	Pressed Steel
	6	Flat	200,000	50	0	Steel	59,500	November	1941	Pressed Steel
Central of Georgia	15	Cov. Hopper	140,000	29	3	Steel	52,900	July	Sept.-Nov.	Pullman-Standard
Champion Paper & Fibre.....	2	Tank	8,000g	36	3	Steel	42,900	January	March	Amer. Car & Fdy.
Charleston & Western Carolina..	35	Hopper	100,000	33	0	Steel	40,300	July	August	Pullman-Standard
Chesapeake & Ohio	300	S. S. Box	100,000	40	6 1/16	Steel	45,400	July	November	Amer. Car & Fdy.
	200	S. S. Box	100,000	40	6	Steel Frame	49,800	July	November	Mount Vernon
	200	S. S. Box	100,000	40	6	Steel	44,000	July	Oct.-Nov.	General American
	200	S. S. Box	100,000	40	6	Steel	45,100	July	October	Pullman-Standard
	100	D. S. Box	100,000	50	6	Steel	59,000	July	October	Greenville
	50	Caboose	60,000	24	0½	Steel Frame	44,000	July	December	St. Louis Car
	50	Caboose	60,000	24	0½	Steel	42,000	July	Jan.-Feb. '41	Magor
	100	Flat	100,000	50	0	St. Underframe	44,700	May	July-Aug.	Pullman-Standard
Chicago & North Western.....	60	Cov. Hopper	140,000	29	3	Steel	51,800	April	August	General American
Chicago, Burlington & Quincy...	100	Cov. Hopper	140,000	29	3	Steel	.....	March	1940	Company Shops
	15	M. T. Gondola	140,000	65	6	Steel	.....	1940	1940	Company Shops
	25	Box	100,000	50	6	St. Underframe	.....	March	1940	Company Shops
	1,000	Box	100,000	40	6	Steel	.....	August	1940-'41	Company Shops
Chicago, Indianapolis & Louisville	100	Hopper	100,000	33	0	Steel	40,300	July	August	Pullman-Standard
	100	Hopper	100,000	33	0	Steel	40,300	September	September	Pullman-Standard
	10	Cov. Hopper	140,000	29	3	Steel	52,900	June	September	General American
	20	Hart Ballast	100,000	33	4⅝	Steel	.....	June	Apr. '41	Amer. Car & Fdy.
Chicago, Milw., St. Paul & Pac..	2,000	Box	100,000	40	6	Steel	42,800	February	Feb.-Aug.	Company Shops
	25	Caboose	60,000	28	0	Steel	39,000	June	September	Company Shops
	35	Cov. Hopper	140,000	29	3	Steel	53,200	March	August	General American
Chicago, Rock Island & Pacific..	60	Cov. Hopper	140,000	29	3	Steel	53,200	March	August	General American
	150	Hopper	100,000	33	0	Steel	40,300	March	Apr.-May	Pullman-Standard
	800	S. S. Box	100,000	40	6	Steel	45,500	July	Dec. '41	Pressed Steel
	200	S. S. Auto	100,000	50	6	Steel	55,300	August	Dec.-Jan. '41	Amer. Car & Fdy.
	100	L. S. Gondola	140,000	65	6	Steel	60,427	August	December	Pullman-Standard
Chicago, South Shore & South Bend	1	Cov. Hopper	140,000	29	3	Steel	52,500	May	August	General American
Chicago, West Pullman & Southern	1	Gondola	100,000	35	5	Steel	51,200	January	September	Company Shops
	1	Gondola	100,000	41	0	Steel	45,700	January	September	Company Shops
Cincinnati, New Orleans & Tex. Pac.	50	Cov. Hopper	140,000	29	3	Steel	51,400	May	September	Pullman-Standard
Cities Service Oil Co.....	2	Tank	10,500g	..	..	....	.....	March	May	General American
	1	Tank	8,000g	..	..	....	.....	March	July	General American
	1	Tank	8,000g	..	..	....	.....	June	July	General American
Colorado & Wyoming.....	15	D. E. Gondola	140,000	65	6	Steel	60,427	September	December	Pullman-Standard
Columbian Carbon Co.	10	Cov. Hopper	80,000	45	10½	Steel	49,200	August	December	Amer. Car & Fdy.
Commodities Car. Co.....	5	Tank	6,000g	32	3	Steel	40,100	June	August	Amer. Car & Fdy.
Consolidated Chemical Industries	2	Tank	10,000g	36	3¾	Steel	48,300	October	December	Amer. Car & Fdy.
Corn Products Refining Co.....	40	Tank	8,000g	..	..	....	.....	Nov.-Dec.	Jan.-Feb. '41	General American
Cornwall	20	Ore	150,000	19	11	Steel Frame	40,000	July	September	Bethlehem
Cudahy Car Lines	50	Refrigerator	80,000	35	4½	St. Underframe	60,000	September	1941	Company Shops
Cumberland Gasoline Co.....	1	Tank	10,500g	..	..	....	.....	March	May	General American
Delaware, Lackawanna & Western	3	D. S. Box	100,000	40	6	Steel	46,480	July	May '41	Magor
Denver & Rio Grande Western..	500	Box	100,000	40	6	Steel	42,500	May	November	Pressed Steel
	500	Box	100,000	40	6	Steel	42,500	October	1941	Pressed Steel
	88	Stock	80,000	36	6	St. Underframe	41,000	-	1940	Company Shops
	10	Caboose	.....	29	2½	St. Underframe	47,000	....	1940	Company Shops
Detroit & Mackinac	5	S. S. Box	100,000	40	6	Steel	45,500	February	May	Pullman-Standard
Detroit, Toledo & Ironton.....	50	Cov. Hopper	140,000	29	3	Steel	51,400	June	Sept.-Oct.	Greenville
	300	D. E. Gondola	100,000	41	6	Steel	50,900	November	Mar. '41	Greenville
Diamond Alkali Co.	2	Tank	10,000g	..	..	....	.....	May	July-Aug.	General American
	2	Tank	.....	..	..	....	.....	September	December	General American
Donora Southern	30	Gondola	140,000	40	0	Steel Frame	51,000	May	Aug.-Sept.	Magor
Dow Chemical Co.	10	Tank	8,000g	36	10	Steel	46,500	March	May	Amer. Car & Fdy.
	2	Tank	60,000	34	2	Steel	65,500	October	December	Amer. Car & Fdy.
	2	Tank	10,000g	..	..	....	.....	February	May	General American
	30	Tank	10,000g	..	..	....	.....	June	Oct.-Nov.	General American
	6	Tank	10,000g	..	..	....	.....	July	October	General American
	1	Tank	50,000	..	..	....	.....	July	September	General American
	1	Tank	50,000	..	..	....	.....	September	December	General American
Duluth, Missabe & Iron Range..	10	Cov. Hopper	140,000	29	3	Steel	51,500	September	Jan. '41	Amer. Car & Fdy.
	30	Ballast	100,000	33	4⅝	Steel	.....	September	Jan. '41	Amer. Car & Fdy.
Duluth, South Shore & Atlantic.	100	D.S. Auto-Box	100,000	40	6	Steel	44,000	September	November	Pullman-Standard
Du Pont de Nemours & Co., E. I.	1	Tank	8,000g	36	8½	Steel	35,900	March	June	Amer. Car & Fdy.
	1	Tank	6,000g	31	6½	Steel	39,500	April	September	Amer. Car & Fdy.
	1	Tank	7,300g	36	10	Steel	43,500	October	December	Amer. Car & Fdy.
	1	Tank	8,200g	36	10	Steel	45,000	October	December	Amer. Car & Fdy.
Electro Bleaching Gas Co.....	3	Tank	60,000	34	2	Steel	65,200	February	May	Amer. Car & Fdy.
	1	Tank	60,000	34	2	Steel	65,200	July	September	Amer. Car & Fdy.
	2	Tank	60,000	..	..	Steel	.....	March	May	General American
Elgin, Joliet & Eastern.....	30	Hopper	100,000	28	0	Steel	41,900	January	August	Company Shops
	250	Hopper	.....	..	..	....	.....	December	1941	Ralston
	350	Gondola	.....	..	..	....	.....	December	1941	General American
	150	Gondola	.....	..	..	....	.....	December	1941	Mount Vernon
	200	Box	.....	..	..	....	.....	December	1941	Mount Vernon
	300	Box	.....	..	..	....	.....	December	1941	Amer. Car & Fdy.
Erie	150	D. E. Gondola	140,000	52	6	Steel	62,000	August	1940	Company Shops
	175	D. E. Gondola	140,000	52	6	Steel	62,000	August	Mar. '41	Company Shops
	100	D. S. Box	100,000	40	6¼	Steel	45,000	October	May '41	Magor
	200	S. S. Box	100,000	40	6 1/16	Steel	45,700	October	Jan. '41	Amer. Car & Fdy.
	100	S.S. Furniture	100,000	50	6 1/16	Steel	59,000	October	Feb. '41	Amer. Car & Fdy.
	250	Hopper	100,000	33	0	Steel	41,500	October	Feb. '41	General American
	250	Hopper	100,000	33	0	Steel	41,900	October	Jan. '41	Pullman-Standard
	250	D. E. Gondola	140,000	52	6	Steel	63,700	October	Jan.-Feb. '41	Greenville
	50	Flat	140,000	53	6	Steel	55,200	November	Jan. '41	Greenville
Ethyl Gasoline Corp.	18	Tank	6,000g	34	6½	Steel	65,000	September	Feb. '41	Amer. Car & Fdy.
	6	Tank	3,000g	31	1½	Steel	52,700	September	Feb. '41	Amer. Car & Fdy.
Fruit Growers Express	10	Refrigerator	100,000	50	0	Steel	76,200	January	June	Company Shops
General American Trans. Corp...	500	Refrigerator	.....	..	..	....	.....	February	.....	Company Shops
General Chemical Co.....	75	Tank	9,850g	37	2¼	Steel	57,200	January	Apr.-June	General American
	1	Tank	8,000g	36	9½	Aluminum Alloy	48,200	August	Jan. '41	Amer. Car & Fdy.
General Electric Co.	1	Cov. Hopper	140,000	29	3	Steel	52,800	June	August	Amer. Car & Fdy.
	2	Cov. Hopper	140,000	29	3	Steel	52,800	October	December	Amer. Car & Fdy.
	1	Cov. Hopper	140,000	29	3	Steel	52,800	November	Jan. '41	Amer. Car & Fdy.
Great Northern	5	Cov. Hopper	140,000	29	3	Steel	52,400	May	August	General American
	500	D. S. Box	100,000	40	6	Steel Frame	49,300	June	October	Pressed Steel
	1,500	D. S. Box	100,000	40	6	Steel Frame	48,600	June	July-Oct.	Pullman-Standard
	500	D. S. Box	100,000	40	6	Steel Frame	48,500	October	Feb. '41	Amer. Car & Fdy.
	500	D. S. Box	100,000	40	6	Steel Frame	49,300	October	Feb. '41	Pressed Steel
	1,000	D. S. Box	100,000	40	6	Steel Frame	48,600	October	Mar. '41	Pullman-Standard
Great West. Electro Chem.....	2	Tank	60,000	..	..	....	.....	March	April	General American
Gulf Coast Lines	100	Stock	80,000	40	0½	Steel Frame	43,900	August	September	Amer. Car & Fdy.
Gulf, Mobile & Ohio	1,000	D. S. Box	80,000	40	6	Steel	43,800	June	December	Amer. Car & Fdy.
	250	Hopper	100,000	33	0	Steel	40,600	June	Sept.-Oct.	Pullman-Standard
Hagy, Harrington & Marsh.....	8	Tank	10,000g	..	..	....	.....	December	Feb. '41	General American

Purchaser	No.	Class	Capacity	Length ft.	Length in.	Construction	Weight	Date of order	Date of Delivery	Builder
Hercules Powder Co., Inc.	10	Tank	8,000g	31	3¾	Steel	42,800	May	July	General American
	12	Tank	50,000	42	3	Steel	69,000	November	Mar. '41	Amer. Car & Fdy.
Hooker Electrochemical Co.	2	Tank	4,000g	28	7¾	Steel	37,900	February	March	Amer. Car & Fdy.
	4	Tank	60,000	30	7	Steel	67,800	June	August	General American
	5	Tank	60,000	30	7	Steel	67,800	October	Dec.-Jan. '41	General American
Huber, Inc., J. M.	6	Cov. Hopper	80,000	45	10½	Steel	49,300	August	December	Amer. Car & Fdy.
Illinois Central	62	Cov. Hopper	140,000	29	3	Steel	52,800	March	July-Aug.	General American
	500	S.S. Auto-Box	80,000	40	6	Steel Frame	52,500	July	Jan. '41	Mount Vernon
	500	D. S. Box	80,000	50	6 1/16	Steel	51,000	July	Nov.-Dec.	Amer. Car & Fdy.
	1,000	D. S. Box	100,000	40	6	Steel	48,100	July	Nov.-Jan. '41	General American
	1,000	D. S. Box	80,000	40	6	Steel	46,000	July	Oct.-Dec.	Pullman-Standard
Illinois Terminal	250	Box	.....	..	..	....	.....	November	.....	Amer. Car & Fdy.
International Great Northern	100	Stock	80,000	40	0½	Steel Frame	43,900	August	September	Amer. Car & Fdy.
Kansas City Southern	8¶	Cov. Hopper	140,000	35	1	Steel	58,800	June	September	General American
Lake Superior & Ishpeming	25	D. S. Box	110,000	40	6	Steel	45,500	February	August	Pullman-Standard
Lehigh & New England	300	Hopper	100,000	33	0	Steel	42,000	November	1941	Pressed Steel
Lehigh Valley	200	Box	110,000	40	6	Steel	45,500	October	Mar. '41	Pressed Steel
	300	Box	110,000	40	6	Steel	46,100	October	Mar. '41	Pressed Steel
	200	D. E. Gondola	140,000	52	6	Steel Frame	54,100	October	Jan. '41	Bethlehem
	50	D. E. Gondola	140,000	65	6	Steel Frame	62,000	October	Jan. '41	Bethlehem
	24	Caboose	.....	24	4⅜	Steel	44,000	January	December	Company Shops
Lennig & Co., Charles	1	Tank	7,000g	32	3	Steel	43,000	July	August	Amer. Car & Fdy.
	1	Tank	7,000g	32	3	Steel	42,400	October	December	Amer. Car & Fdy.
Linde Air Products	10	Box	140,000	40	6	Steel	113,000	July	October	Pressed Steel
Litchfield & Madison	50	Hopper	100,000	..	..	Steel	.....	November	Apr. '41	Amer. Car & Fdy.
	50	Hopper	100,000	33	0	Steel	41,500	November	Jan. '41	General American
Louisville & Nashville	100	Auto-Box	100,000	50	6	Steel	54,400	August	December	Pullman-Standard
	100	Auto-Box	100,000	50	6	Steel	54,400	November	Mar. '41	Pullman-Standard
	50	M.T. Gondola	140,000	65	6	Steel	60,426	September	December	Pullman-Standard
	50	M.T. Gondola	140,000	65	6	Steel	60,426	November	Mar. '41	Pullman-Standard
	250	Hopper	100,000	33	0	Steel	40,500	August	Sept.-Oct.	Pullman-Standard
	250	Hopper	100,000	33	0	Steel	40,700	August	Sept.-Oct.	Pullman-Standard
	1,600	Hopper	100,000	33	0	Steel	41,200	November	Mar. '41	Pullman-Standard
	25	Cov. Hopper	140,000	29	3	Steel	53,100	May	August	Pullman-Standard
	1,400	Hopper	140,000	33	0	Steel	41,000	November	June '41	Amer. Car & Fdy.
Mesta Machine Co.	1	Hot Ingot	350,000	50	0	Steel	119,500	February	May	Pressed Steel
Minneapolis & St. Louis	10	Cov. Hopper	140,000	29	3	Steel	52,500	Dec. '39	June	General American
Minneapolis, St. P. & S. Ste. Marie	100	D. S. Auto	100,000	50	0	Steel	50,000	June	September	Pullman-Standard
	400	D. S. Box	100,000	40	6	Steel	44,000	June	Aug.-Sept.	Pullman-Standard
	250	D. S. Box	100,000	40	6	Steel	44,000	September	Nov.-Dec.	Pullman-Standard
	5	Cov. Hopper	140,000	29	3	Steel	52,800	July	August	Amer. Car & Fdy.
Missouri Pacific	2	Cab.-Ch.-Bag.	30,000	37	6½	Steel	52,000	May	December	Company Shops
	30	Cov. Hopper	140,000	29	3	Steel	53,500	May	November	Mount Vernon
Monessen Southwestern	1	Air Dump	30 cu. yds.	34	0	Steel	29,500	March	June	Pressed Steel
Monsanto Chemical Co.	2	Tank	8,000g	36	3¾	Steel	43,000	January	February	Amer. Car & Fdy.
	2	Tank	9,800g	36	10½	Steel	51,780	May	August	Amer. Car & Fdy.
	2	Tank	7,200g	37	6	Steel	59,600	September	December	Amer. Car & Fdy.
	2	Tank	7,200g	37	5½	Steel	59,100	November	Feb. '41	Amer. Car & Fdy.
	2	Tank	8,000g	..	..	Steel	43,600	February	March	General American
	2	Tank	8,000g	..	..	Steel	43,600	June	September	General American
	6	Tank	8,000g	..	..	Steel	43,600	November	Feb. '41	General American
	3	Tank	4,000g	..	..	Steel	37,500	November	Feb. '41	General American
	1	Tank	4,000g	..	..	Steel	43,700	September	November	General American
Nashville, Chattanooga & St. Louis	25	Cov. Hopper	140,000	29	3	Steel	53,000	May	August	Pullman-Standard
Newburgh & South Shore	60	Hopper-Ore	150,000	19	10⅞	Steel Frame	43,900	May	July-Aug.	Pullman-Standard
New York Central	500	Cov. Hopper	140,000	26	5	Steel	54,500	April	July	Despatch Shops
	1,500	S. C. Hopper	110,000	31	6	Steel	40,900	April	August	Despatch Shops
	200	Flat	140,000	52	6	Steel	60,000	October	Jan. '41	Despatch Shops
	800	Box	110,000	50	6	Steel	.....	December	1941	Despatch Shops
	200	Auto. Box	110,000	50	6	Steel	.....	December	1941	Despatch Shops
New York, Chicago & St. Louis	250	D. E. Gondola	100,000	48	6	Steel	50,100	July	Sept.-Oct.	Pullman-Standard
	200	D. E. Gondola	100,000	48	6	Steel	49,100	July	Sept.-Oct.	General American
	50	D. E. Gondola	140,000	65	6	Steel Frame	66,100	July	October	Bethlehem
	75	Flat	100,000	50	0	St. Underframe	45,000	July	Oct.-Nov.	Bethlehem
	10	Cont.-Gondola	200,000	40	6	Steel	45,400	March	May-June	Pullman-Standard
	50	Cov. Hopper	140,000	29	3	Steel	51,100	March	May	Amer. Car & Fdy.
	300	Box	100,000	40	6 9/16	Alloy Steel	42,200	July	December	Amer. Car & Fdy.
Norfolk & Western	500	D. S. Box	100,000	40	6	Steel Frame	49,200	July	November	Ralston
	500	Gondola	110,000	46	0	Steel	42,700	September	Dec.-Jan. '41	Ralston
	50	D. S. Box	100,000	50	6	Steel	55,500	July	Oct.-Nov.	Greenville
	50	D. S. Box	100,000	50	6	Steel	55,500	January	April	Greenville
	50	D. S. Box	100,000	50	6	Steel	59,900	January	April	Greenville
	500	Hopper	110,000	30	11¾	Steel	41,400	July	Sept.-Nov.	Virginia Bridge
	500	Gondola	110,000	46	0	Steel	43,200	September	Dec.-Feb. '41	Virginia Bridge
	500	Hopper	110,000	30	11¾	Steel Frame	41,200	July	Oct.-Nov.	Bethlehem
	30	Cov. Hopper	140,000	38	0	Steel	57,300	October	Jan.-Feb. '41	Company Shops
Norfolk Southern	40	Flat	100,000	47	3¼	Steel Frame	52,800	April	August	Greenville
	12	Caboose	.....	27	0⅜	Steel	50,000	April	December	Magor
	250	Box	80,000	40	6	Steel Frame	44,500	November	May-July '41	Magor
	50	Hopper	100,000	30	11¾	Steel	.....	November	.....	Virginia Bridge
	50	Gondola	100,000	41	9	Steel	.....	November	Feb. '41	Amer. Car & Fdy.
North American Car Corp	9	Tank	6,000g	41	6¾	Steel	57,620	March	September	Amer. Car & Fdy.
North Western Refrigerator Line	100	Refrigerator	80,000	32	9⅜	St. Underframe	62,000	March	July	Amer. Car & Fdy.
	100	Refrigerator	100,000	42	6	Steel	67,075	March	August	Amer. Car & Fdy.
Northern Pacific	30	Cov. Hopper	140,000	29	3	Steel	52,500	May	August	General American
	1,000	Box	.....	..	..	....	.....	December	1941	Amer. Car & Fdy.
	200	Ballast	.....	..	..	....	.....	December	1941	Amer. Car & Fdy.
	300	Coal	.....	..	..	....	.....	December	1941	Amer. Car & Fdy.
	900	Box	.....	..	..	....	.....	December	1941	Pullman-Standard
	100	Box	.....	..	..	....	.....	December	1941	Company Shops
Old Hickory Chemical Co.	2	Tank	10,000g	..	..	....	.....	January	April	General American
	1	Tank	10,000g	..	..	....	.....	August	October	General American
Panama	20	Flat	100,000	50	0	St. Underframe	40,000	June	October	Magor
	30	D. S. Box	100,000	50	6	Steel Frame	46,500	June	Oct.-Nov.	Magor
	35	Flat	100,000	50	0	St. Underframe	40,000	October	June '41	Magor
	30	D. S. Box	100,000	50	6	Steel Frame	46,500	October	June '41	Magor
	15	Gondola	100,000	50	8½	Steel	42,500	November	June '41	Magor
Pennsylvania	100	Cov. Hopper	140,000	31	0	Steel	50,000	February	April	Company Shops
	1,900	Gondola	140,000	52	6	Steel	55,800	June	Mar. '41	Company Shops
	200	Gondola	140,000	65	6	Steel	63,400	June	November	Company Shops
	225	Cov. Hopper	140,000	31	0	Steel	50,000	June	December	Company Shops
	20	Flat	250,000	48	3½	Steel	106,500	June	Feb. '41	Company Shops
	200	Caboose	.....	23	3¾	Steel	.....	June	Apr., '41	Company Shops
	10	Flat	250,000	53	2	Steel	108,500	June	October	Company Shops
	1	Tank	10,500	..	..	Steel	.....	October	December	Amer. Car & Fdy.
Pennsylvania Salt Mfg. Co.	2	M. U. Tank	30,000	42	4⅛	Steel	53,400	August	August	Amer. Car & Fdy.
	6	Tank	60,000	34	2	Steel	65,100	October	Jan. '41	Amer. Car & Fdy.
Pere Marquette	200	D. E. Gondola	140,000	50	6	Steel Frame	60,300	October	Feb. '41	Bethlehem
	200	S. S. Box	100,000	40	6 1/16	Steel	45,400	September	Jan. '41	Amer. Car & Fdy.
	150	S. S. Box	100,000	40	6	Steel	45,100	October	Dec.-Jan. '41	Pullman-Standard
	150	S. S. Box	100,000	40	6	Steel	44,000	September	Jan. '41	General American

¶ Leased.

Purchaser	No.	Class	Capacity	Length ft.	Length in.	Construction	Weight	Date of order	Date of Delivery	Builder
Pere Marquette (Cont'd)	50	Auto.-Furn.	100,000	50	6	Steel	58,800	September	December	Greenville
	50	Auto	100,000	50	6	Steel	71,500	September	December	Greenville
Phillips Petroleum Co.	24	Tank	10,500g	..	..	....	.....	June	August	General American
	20	Tank	10,500g	..	..	....	.....	September	Oct.-Dec.	General American
Phosphate Minine Co.	1	Tank	8,000g	36	3¾	Steel	44,300	May	June	Amer. Car & Fdy.
Pittsburgh & Lake Erie	500	Box	110,000	40	6 1/16	Steel	45,600	March	July	Pressed Steel
	500	Box	110,000	40	6 1/16	Steel	45,100	March	June-July	Pullman-Standard
	1,000	H. S. Gondola	140,000	52	6	Steel	56,000	September	Nov.-1941	Despatch Shops
Pittsburgh & West Virginia	5	Caboose	80,000	24	4⅜	Steel	42,400	June	September	Company Shops
Pittsburgh Plate Glass	3	Tank	60,000	34	2	Steel	65,500	July	September	Amer. Car & Fdy.
	5	Tank	60,000	34	2	Steel	65,500	September	November	Amer. Car & Fdy.
	9	Tank	60,000	34	2	Steel	65,500	October	Jan. '41	Amer. Car & Fdy.
	5	Tank	60,000	..	..	....	.....	September	October	General American
	8	Tank	60,000	..	..	....	.....	October	Dec.-Jan. '41	General American
Reading	1,000	S. C. Hopper	100,000	31	6	Steel	41,000	September	July '41	Company Shops
	50	Caboose	.....	24	4⅜	Steel	41,700	September	Feb. '41	Company Shops
Republic Steel Corp	3	Cinder Pot	250,000	31	6	Steel	76,000	August	December	Pressed Steel
St. Louis Refrigerator Car Co.	25	Refrigerator	.....	..	..	....	.....	January	1940	Company Shops
St. Louis Southwestern	12	Caboose	.....	29	0	St. Underframe	41,500	.....	Apr.-June	Company Shops
	200	Box	100,000	40	0	Steel	.....	December	1941	Company Shops
	100	Box	100,000	50	0	Steel	.....	December	1941	Company Shops
	50	Gondola	140,000	..	..	Steel	.....	December	1941	Company Shops
	50	Flat	140,000	..	..	Steel	.....	December	1941	Company Shops
Seaboard Air Line	200	Hopper	140,000	..	..	....	.....	November	.....	Bethlehem
	50	Cov. Hopper	140,000	29	3	Steel	52,700	June	September	Pullman-Standard
	500	Box	100,000	40	6	Steel	48,900	November	1941	Pullman-Standard
Semet-Solvay Co.	1	Tank	10,000g	36	0	Steel	46,700	March	May	Amer. Car & Fdy.
	1	Tank	10,000g	36	3¾	Steel	47,600	August	November	Amer. Car & Fdy.
Sheffield Steel Co.	6	Slag	200,000	..	..	Steel	.....	April	September	Mount Vernon
Shell Chemical Co.	2	Tank	11,200g	..	..	....	.....	September	December	General American
Shell Oil Co., Inc.	1	Tank	10,500	40	5	Steel	68,500	March	June	Amer. Car & Fdy.
	5	Tank	12,500g	..	..	....	.....	August	December	General American
Shippers' Car Line	9	Cov. Hopper	140,000	29	3	Steel	52,800	April	September	Amer. Car & Fdy.
	40	Cov. Hopper	140,000	29	3	Steel	52,800	April	July	Amer. Car & Fdy.
	1	M. U. Tank	80,000	45	4⅛	Steel	33,500	April	April	Amer. Car & Fdy.
	1	M. U. Tank	80,000	42	4⅛	Steel	33,000	October	October	Amer. Car & Fdy.
	12	Flat	140,000	50	0	Steel	47,400	May	December	Amer. Car & Fdy.
	16	Tank	4,000g	..	..	Steel	.....	April	April	Amer. Car & Fdy.
	5	Tank	4,500g	..	..	Steel	.....	April	April	Amer. Car & Fdy.
	37	Tank	6,000g	..	..	Steel	.....	April	April	Amer. Car & Fdy.
	24	Tank	7,000g	..	..	Steel	.....	April	April	Amer. Car & Fdy.
	29	Tank	8,000g	..	..	Steel	.....	April	April	Amer. Car & Fdy.
	110	Tank	10,000g	..	..	Steel	.....	April	April	Amer. Car & Fdy.
	5	Tank	10,500g	..	..	Steel	.....	April	April	Amer. Car & Fdy.
	2	Tank	12,000g	..	..	Steel	.....	April	April	Amer. Car & Fdy.
	5	Tank	60,000	..	..	Steel	.....	April	April	Amer. Car & Fdy.
	23	Tank	6,000g	..	..	Steel	.....	October	October	Amer. Car & Fdy.
	23	Tank	8,000g	..	..	Steel	.....	October	October	Amer. Car & Fdy.
	52	Tank	10,000g	..	..	Steel	.....	October	October	Amer. Car & Fdy.
	25	Tank	50,000	..	..	Steel	.....	October	October	Amer. Car & Fdy.
	3	Tank	60,000	..	..	Steel	.....	October	October	Amer. Car & Fdy.
Solvay Process Co.	5	Tank	10,000g	37	11½	Steel	60,000	November	Jan. '41	Amer. Car & Fdy.
	4	M. U. Tank	80,000	42	4⅛	Steel	53,400	November	Jan. '41	Amer. Car & Fdy.
	54	Tank	60,000	..	..	....	.....	December	Feb.-Mar. '41	General American
Southern	1,500	Box	80,000	40	6	Steel	44,850	September	Dec.-Feb. '41	Pullman-Standard
	750	Hopper	100,000	33	0	Steel	42,700	September	Jan.-Feb. '41	Pressed Steel
	821	Gondola	100,000	40	9	Steel	46,400	Sept.-Oct.	Dec.-Feb. '41	Amer. Car & Fdy.
	250	L. S. Gondola	100,000	41	6	Steel	42,200	September	Jan.-Feb. '41	Mount Vernon
Southern Acid & Sulphur	2	Tank	8,000g	36	3¾	Steel	45,000	February	May	Amer. Car & Fdy.
	2	Tank	7,000g	..	..	....	.....	October	Jan. '41	General American
Southern Alkali Corp.	5	Tank	60,000	34	2	Steel	65,500	February	March	Amer. Car & Fdy.
	3	Tank	60,000	34	2	Steel	65,500	June	August	Amer. Car & Fdy.
	3	Tank	60,000	..	..	....	.....	July	Aug.-Dec.	General American
Southern Pacific	500	Box	100,000	40	6 1/16	St. Underframe	44,000	August	Dec.-Jan. '41	General American
	500	Box	100,000	40	6 1/16	St. Underframe	45,900	August	Dec.-1941	Pressed Steel
	500	Box	100,000	40	6 1/16	St. Underframe	46,600	August	Dec.-Jan. '41	Bethlehem
	500	S. S. Auto	100,000	50	6	Steel Frame	62,000	August	Jan.-Feb. '41	Mount Vernon
	350	H. B. Ballast	140,000	31	0⅞	Steel	48,100	August	December	Amer. Car & Fdy.
	125	Flat	140,000	53	6	St. Underframe	52,000	August	Jan.-Feb. '41	Company Shops
	15	D. E. Gondola	140,000	65	6	Steel	61,000	August	Mar. '41	Company Shops
	50	Caboose	80,000	29	3 11/16	Steel	47,000	August	Dec.-Jan. '41	Company Shops
Stauffer Chemical Co.	1	Tank	8,000g	..	..	....	.....	June	September	General American
	1	Tank	8,000g	..	..	....	.....	August	October	General American
	2	Tank	10,000g	..	..	....	.....	November	Feb. '41	General American
	1	Tank	6,000g	..	..	....	.....	December	Feb. '41	General American
Tennessee Central	65	Hopper	100,000	33	0	Steel	40,300	September	October	Pullman-Standard
	100	Box	80,000	40	6	Steel	44,350	October	Mar. '41	Pullman-Standard
Tennessee Coal, Iron & R. R.	16	Air Dump	50 cu. yds.	40	4	Steel	82,300	May	December	Pressed Steel
	10	Ore	140,000	20	11⅞	Steel	44,300	May	October	Pullman-Standard
	8	Hot Mould	140,000	40	0	Steel	52,400	August	1941	Pullman-Standard
	13	Gondola	140,000	38	6⅜	Steel	56,800	August	1941	Pullman-Standard
Tennessee Copper Co.	10	Air Dump	20 cu. yds.	23	7½	Steel	55,900	February	July	Pressed Steel
Tennessee Eastman Corp.	2	Tank	8,000g	37	3¾	Aluminum	35,700	January	April	Amer. Car & Fdy.
	2	Tank	8,000g	37	3¾	Aluminum	35,700	October	November	Amer. Car & Fdy.
	2	Tank	8,000g	37	3¾	Aluminum	35,700	November	Jan. '41	Amer. Car & Fdy.
Union Carbide & Carbon Co.	4	Cov. Hopper	100,000	22	8⅜	Steel	43,900	October	December	Greenville
Union Pacific	1,000	Ballast	100,000	33	4⅝	Steel	.....	September	Mar. '41	Amer. Car & Fdy.
	100	Cov. Hopper	140,000	29	3	Steel	53,100	July	November	General American
	2,000	Box	100,000	..	..	Steel	.....	December	1941	Company Shops
	250	Auto-Box	100,000	..	..	....	.....	December	1941	Company Shops
Union Starch & Refining Co.	10	Tank	8,000g	..	..	....	.....	August	October	General American
Union Tank Car Co.	125	Tank	100,000	..	..	....	.....	June	.....	Company Shops
	25	Tank	100,000	..	..	....	.....	August	.....	Company Shops
	100	Tank	100,000	..	..	....	.....	October	Mar. '41	Company Shops
United Carbon Co.	10	Cov. Hopper	80,000	45	10	Steel	53,100	August	November	General American
	10	Cov. Hopper	80,000	43	10½	Steel	49,300	October	December	Amer. Car & Fdy.
United States Government	4	Box	100,000	40	6	Steel	44,000	December	Feb. '41	General American
United States Navy Dept.	3	D. S. Box	100,000	39	9⅞	Steel	50,700	January	May	Greenville
	15	Flat	100,000	40	5¾	Steel	37,950	October	December	Amer. Car & Fdy.
	1	Tank	10,000g	36	3¾	Steel	47,300	October	Jan. '41	Amer. Car & Fdy.
	1	Box	100,000	40	6	Steel	45,400	March	May	Amer. Car & Fdy.
	1	Tank	12,500g	..	..	....	.....	March	May	General American
	7	Flat	40,000	20	0	Steel Frame	16,000	November	December	Pac. Car & Fdy.
	5	Flat	40,000	20	0	Steel Frame	15,000	November	December	Pac. Car & Fdy.
	6	Gondola	100,000	40	0	....	.....	November	.....	Haffner-Thrall
	5	Flat	100,000	40	0	....	.....	November	.....	Haffner-Thrall
	3	Box	100,000	40	0	....	.....	November	.....	Haffner-Thrall
	2	Flat	100,000	..	..	....	.....	February	.....	Haffner-Thrall
	1	Gondola	100,000	..	..	Steel	.....	February	.....	Haffner-Thrall
	1	Box	100,000	..	..	Steel	.....	February	.....	Haffner-Thrall
United States War Dept.	20	Box	80,000	40	6	Steel	43,600	October	Jan. '41	General American
	1	Tank	10,000g	36	3¾	Steel	47,300	February	May	Amer. Car & Fdy.
	260	Tank	10,000g	36	3¾	Steel	47,300	October	Feb. '41	Amer. Car & Fdy.
	82	Tank	10,000g	36	3¾	Steel	47,700	June	August	Amer. Car & Fdy.
	24	S. S. Box	80,000	40	0¼	Steel	43,800	February	May	Greenville

Purchaser	No.	Class	Capacity	Length ft.	Length in.	Construction	Weight	Date of order	Date of Delivery	Builder
U. S. War Dept. (Cont'd).....	4	Flat	80,000	..	..	....	.....	November	.....	Haffner-Thrall
	6	Flat	80,000	..	..	....	.....	February	.....	Haffner-Thrall
Utah Copper Co.	100	Ore	200,000	24	5⅛	Steel	46,000	November	1941	Pressed Steel
	15	Air Dump	40 cu. yds.	35	10	Steel	78,600	November	1941	Pressed Steel
	2	Ballast	140,000	35	0	Steel	.....	November	Jan. '41	Amer. Car & Fdy.
Virginian	500	Hopper	110,000	33	0	Steel	42,600	May	Feb. '41	Company Shops
	2	Cov. Hopper	140,000	29	3	Steel	52,900	June	September	Pullman-Standard
Wabash	5	Cov. Hopper	140,000	29	3	Steel	51,500	May	July	Amer. Car & Fdy.
	5	Cov. Hopper	140,000	29	3	Steel	51,500	November	Jan. '41	Amer. Car & Fdy.
	5	Cov. Hopper	140,000	29	3	Steel	51,500	December	1941	Amer. Car & Fdy.
Warren Petroleum Corp.	25	Tank	10,000g	..	..	Steel	67,000	May	July-Aug.	General American
	4	Tank	10,500g	..	..	Steel	67,000	May	August	General American
	15	Tank	10,500g	..	..	Steel	67,000	August	Oct.-Nov.	General American
	10	Tank	10,500g	40	5	Steel	68,500	August	November	Amer. Car & Fdy.
	30	Tank	11,000g	39	10	Steel	65,600	July	September	Amer. Car & Fdy.
Wheeler, Reynolds & Hauffer...	2	Tank	8,000g	..	..	....	.....	April	June	General American
Wheeling & Lake Erie.....	302	S. S. Box	100,000	40	6 1/16	Steel Frame	45,100	October	Dec.-Jan. '41	Pullman-Standard
	200	S. S. Box	100,000	40	6 1/16	Steel Frame	45,000	October	Jan. '41	Amer. Car & Fdy.
Wheeling Steel Corp.	1	Cinder Pot	200,000	38	4	Steel	73,000	April	July	Pressed Steel
Wilson Car Lines	200	Refrigerator	75,000	34	11	Steel Frame	56,000	January	Jan.-Nov.	Company Shops
	200	Refrigerator	75,000	34	11	Steel Frame	56,000	October	Nov.-Aug., '41	Company Shops
Wisconsin Central	50	D. S. Box	100,000	40	6	Steel	44,000	September	December	Pullman-Standard
	100	D. S. Auto	100,000	50	0	Steel	50,300	September	Dec.-Jan. '41	Pullman-Standard
Youngstown Sheet & Tube Co...	1	Cinder Pot	200,000	31	6	Steel	61,100	July	October	Pressed Steel

United States—Export

Purchaser	No.	Class	Capacity	Length ft.	Length in.	Construction	Weight	Date of order	Date of delivery	Builder
Brazilian Government	150	Gondola	60,000	34	5¾	Steel	28,350	October	1941	Pullman-Standard
	150	Flat	60,000	38	5⅜	Steel	20,695	October	1941	Pullman-Standard
	150	Box	60,000	..	..	....	.....	October	1941	Amer. Car & Fdy.
	8	Tank	60,000	..	..	....	.....	.....	.....	Amer. Car & Fdy.
Central Venezuela	3	Flat	30,000	25	6	St. Underframe	11,340	February	August	Magor
Ebasco Services, Colombia, S. A.	2	Tank	6,000g	33	0	Steel	30,915	March	Feb. '41	Magor
F. C. del Pacifico de Nicaragua.	15	Banana	66,120	39	2	Steel	26,200	January	August	Magor
F. C. El Palito-Palma Sola, Venezuela	40	Banana	40,000	32	2¾	Steel Frame	26,000	June	September	Magor
Gregg Co., Ltd. (S. A.).....	10	Flat	24,000	25	0	Steel	9,910	July	December	Pressed Steel
	20	Cane	40,000	31	2	Steel	16,400	September	Jan. '41	Pressed Steel
	20	Box	66,000	41	10¾	Steel	21,000	November	1941	Pressed Steel
O. Philipp & Co. (S. A.)	8	Flat	40,000	26	3	Steel	14,980	May	June	Pressed Steel
Peru	5	Flat	50,000	30	0	Steel	19,400	July	October	Pressed Steel
Petroleous Mexicanos	15	Flat	30,000	26	0	Steel	7,550	June	November	Pressed Steel
Royal State Rys. of Siam.....	500	S. S. Box	27,500	21	6	Steel	18,600	March	Apr.-May, '41	Magor
Sao Paulo-Parana, Brazil.....	25	S. S. Box	60,000	37	10½	....	23,790	August	December	Pullman-Standard
Selma Mercantile Corp., Venezuela	3	Flat	30,000	25	6	St. Underframe	11,340	August	Jan. '41	Magor
U. S. S. R.	192	Air Dump	80,000	26	0	Steel	54,000	September	Nov.-Dec.	Magor
	100	Air Dump	80,000	29	6	Steel	44,000	September	Jan. '41	Magor
	100	Air Dump	80,000	24	0	Steel	51,760	September	Mar. '41	Magor
	8	Air Dump	100,000	34	0	Steel	70,000	September	Feb. '41	Magor
	100	Air Dump	30 cu. yds.	30	7⅝	Steel	74,000	October	1941	Pressed Steel
United Fruit Company	100	Banana	30,000	39	11¾	Steel	23,500	August	December	Pullman-Standard
	20	Banana	30,000	39	11¾	Steel	23,500	September	December	Pullman-Standard
Usina Santa Thersinah, (Brazil)	30	Cane	20,000	20	10	Steel	11,180	April	September	Magor

Canada

Purchaser	No.	Class	Capacity	Length ft.	Length in.	Construction	Weight	Date of order	Date of delivery	Builder
Algoma Central & Hudson Bay..	69	Flat	80,000	38	10	St. Underframe	36,800	February	June	Company Shops
Altoona Nitrogen Co.	15	Tank	11,410g	40	7¼	Steel	.....	September	December	Can. Car & Fdy.
Canadian General Transit Co....	1	Tank	4,150g	28	10⅛	Steel	39,400	August	October	Can. Car & Fdy.
Canadian Industries, Ltd.....	5	Tank	5,838g	30	3	Steel	66,200	January	March	Can. Car & Fdy.
Canadian National	150	Ballast	100,000	40	0	Steel Frame	55,200	April	June-July	Can. Car & Fdy.
	15	Caboose	80,000	29	2	St. Underframe	.....	April	Oct.-Dec.	Company Shops
Canadian Pacific	300	Hopper	100,000	33	0	Steel	43,000	August	December	National Steel
	100	L. S. Gondola	140,000	48	6¼	Steel	50,000	August	December	National Steel
	100	L. S. Gondola	150,000	48	6¼	Steel Frame	49,800	August	Dec., 1941	Can. Car & Fdy.
Consolidated Mining & Smelting, Ltd.	3	Tank	7,000g	30	5	Steel	44,200	May	August	Can. Car & Fdy.
Defence Industries, Ltd.....	15	Tank	7,500g	30	1	Steel	52,300	May	August	Can. Car & Fdy.
	5	Tank	7,500g	30	1	Steel	52,100	July	November	Can. Car & Fdy.
Dominion Steel & Coal.....	20	Hopper-Ore	100,000	28	0	Steel	41,200	February	April	Eastern Car Co.
	10	Flat	100,000	41	8	Steel	35,700	February	June	Eastern Car Co.
	7	D. S. Box	80,000	40	6	Steel	43,500	February	April	Eastern Car Co.
International Nickel Co.....	15	Ore	140,000	23	0	Steel	.....	November	.....	National Steel
Roberval & Saguenay	2	Caboose	.....	29	0	Wood Frame	.....	November	1941	Can. Car & Fdy.
Shawinigan Chemical Co.....	1	Tank	4,500g	11	5¼	Steel	.....	October	December	Can. Car & Fdy.
Sydney & Louisburg	15	D. S. Box	80,000	40	6	Steel	43,500	February	April	Eastern Car Co.
	20	Gondola	100,000	40	4½	Steel	43,800	February	June	Eastern Car Co.
	10	Air-Dump	100,000	34	0	Steel	72,900	February	July	Eastern Car Co.
Temiskaming & Northern Ontario	50	Flat	100,000	40	0	Steel	40,400	February	June	National Steel
	8	Caboose	.....	28	5⅜	Steel	49,500	May	October	National Steel

The Ralston Steel Car Company Built 500 of These Gondolas for the Norfolk & Western

The Burlington's Diesel-Electric Locomotive "Silver Bullet" Built by the Electro-Motive Corp.

Locomotives Ordered in 1940

Total of 694 purchased for domestic service greatly exceeds any year since 1929—Export orders also rise sharply

By Arthur J. McGinnis

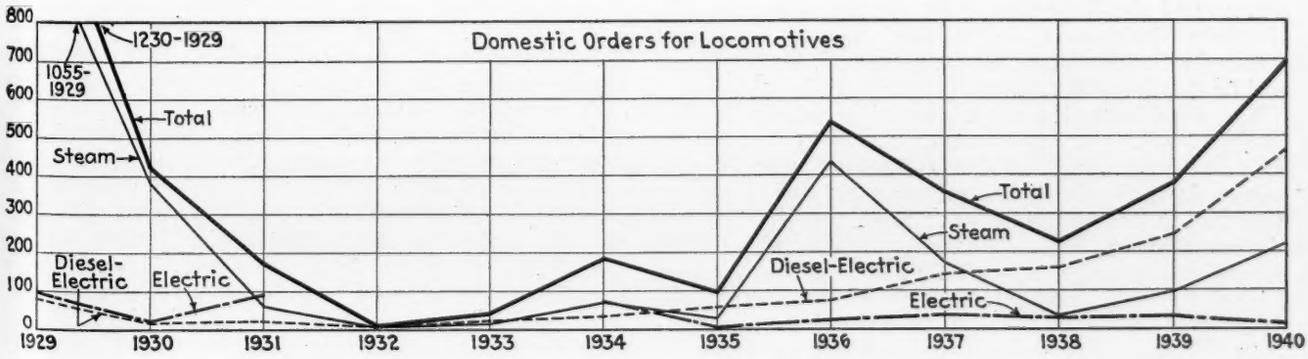
Associate Editor

LOCOMOTIVE orders placed in the United States for domestic service during the year 1940 established a new peak for the 1929-1940 period. Bearing out earlier indications, domestic orders during closing months of 1940 mounted rapidly to a total of 694 for the year, an increase of 321 locomotives or 87 per cent as compared with 1939 and an increase of 158 locomotives or 30 per cent as compared with 1936, the largest preceding year since 1929. Following the usual seasonal pattern in evidence in recent years and influenced no doubt by deferred demand, armament program requirements and the general upward trend in business and railroad earnings—orders in the latter months of 1940 greatly exceeded earlier placements. More than 62 per cent of total orders, or 436 locomotives, were placed in the last six months as compared with 258 locomotives previously reported. A total of 79 were placed in December. These purchases, on many of which construction has only begun, evidences railroad executive opinion as to the volume of traffic to be anticipated.

Of the 694 domestic locomotives ordered during 1940, 219 were steam, 462 Diesel-electric or other internal combustion types and 13 electric. This compares with totals of 95 steam, 246 Diesel-electric and 32 electric units ordered in 1939 and represents increases over last year of 124 steam locomotives or 131 per cent, 216 Diesel-electric locomotives or 88 per cent, and a decrease of 19 electric locomotives.

The heavy increase in volume of Diesel-electric locomotive orders placed for domestic service, nearly double the number purchased last year, is particularly outstanding. As will be noted in Table III and chart, the 462 units ordered represent a new high in an uninterrupted upward trend in number purchased each year since 1932. Purchases were divided as follows: 64 for passenger service, 382 for switching service, 12 for freight or switching service and four miscellaneous. As compared with last year these orders represent increases of 39 units for passenger service, 181 units for switching service and a decrease of two units for freight or switching service.

The increase in number of passenger-train units pur-



chased evidences the demand for high speed streamlined Diesel-electric trains. Large purchases for passenger service included 18 of 2,000-hp. by the Atlantic Coast Line, six of 2,000-hp. and two of 1,000-hp. by the Chicago, Rock Island & Pacific, four of 4,000-hp. and three of 2,000-hp. by the Southern, three of 4,000-hp. and two of 6,000-hp. by the Union Pacific, three of 4,000-hp. and two of 2,000-hp. by the Atchison, Topeka & Santa Fe and three of 4,000-hp. and one of 2,000-hp by the Baltimore & Ohio.

The year 1940 witnessed a notable increase in number of small Diesel-electric switching units. Of the 382 Diesel-electric switching locomotives ordered, 63 or 17 per cent were of 380-hp. or less. This compares with 22 units of corresponding horsepower ordered in 1939. The greatest number of switching locomotives purchased, 201 units or 53 per cent of total, were of 600 or 660-hp. Large orders for switching units included 36, chiefly of 600- and 1000-hp. by the Chicago, Milwaukee, St. Paul & Pacific, 26 of 600-hp. and nine of 660-hp. by the New York Central, 25 of 1,000-hp. by the Union Pacific and 16 of 600-hp. and nine of 1,000-hp. by the Baltimore & Ohio. If one Diesel-electric switching locomotive is considered as replacing more than one steam unit, the heavy volume of purchases during the past year becomes even more significant.

Table I—Locomotive Orders in 1940

For service in the United States	694
For export from the United States	85
For service in Canada and export from Canada	3
Grand total	782

Table II—Orders for Locomotives 1929-1940

Year	Domestic (A)	U. S. Export	Canadian (Incl. Export)	Total
1940	694	85	3	782
1939	373	40	56	469
1938	225	24	35	284
1937	354	56	57 (Inc. Export)	467
1936	536	22	1	559
1935	97*	15	27	139
1934	185	17	..	202
1933	42	7	..	49
1932	12	1	1 (Export)	14
1931	174	28	2	204
1930	421	20	95	536
1929	1,230	106	77	1,413

(A)—Adjusted. For division as between Steam, Diesel-electric and Electric Locomotives, see Table III and chart.
* Revised to include locomotives for articulated or partially articulated trains.

The 219 steam locomotives purchased for domestic service during the past year was exceeded in the period since 1929 only by the 382 units ordered in 1930 and the 435 ordered in 1936. Of the total, 74 were purchased for passenger service, 137 for freight service and 8 for switching service. Large purchases included fifty 4-8-2 type, chiefly for freight service, by the New York Central, twenty 4-6-6-4 type for freight service by the Delaware & Hudson, eight 4-8-4 type for passenger service and six 4-6-6-4 type for freight service by the Northern Pacific and twenty 4-8-4 type for passenger service by the Southern Pacific. Other sizable purchases will be noted in the tables.

The year 1940 also saw a general broadening of the foreign market for American-built railway equipment. This has been particularly manifested in increasing inquiries from South American countries, and a further diversion of orders from former foreign sources of supply would appear likely. Foreign purchases placed with American companies during 1940 totaled 85 locomotives, divided 55 steam and 30 electric. This is more than double the total of 40 locomotives ordered for export in 1939 (36 steam and 4 Diesel-electric) and is by far the largest volume booked in any year since 1929. South American countries placed the bulk of the orders, with Brazil the leading purchaser. A total of 43 steam and 20 electric locomotives will be constructed for service on Brazilian lines.

Table III—Domestic Orders for Locomotives 1929-1940

Year	Steam	Diesel-Electric	Electric	Total
1940	219	462	13	694
1939	95	246	32	373
1938	36	160	29	225
1937	173	145	36	354
1936	435	77	24	536
1935	30	60	7	97
1934	72	37	76	185
1933	17	25	..	42
1932	5	7	..	12
1931	62	21	91	174
1930	382	18	21	421
1929	1,055	80	95	1,230

Note: In certain instances domestic orders placed in December are not reported until following year. Statistics for years 1929-1939 have been revised to eliminate this overlap.

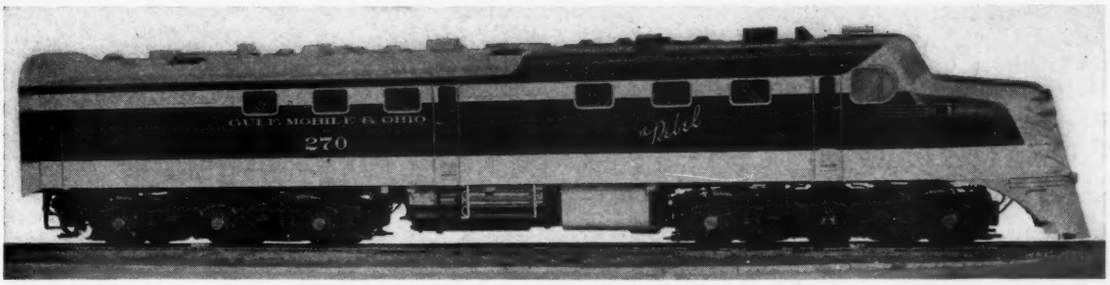
One of the outstanding export orders was placed by the State of Sao Paulo, Brazil, for the government owned Sorocabana railroad with the Electrical Export Corporation, a joint subsidiary of the International General Electric Company and the Westinghouse International Electric Manufacturing Co. The contract calls for electrification of approximately 207 track-miles and construction of twenty 130-ton locomotives for main line freight and passenger service and four 3-car multiple-unit motor car trains for suburban service. (Order for these motor car trains is included under "Passenger-train cars" elsewhere in this issue.) The section to be electrified is the double-track division from Sao Paulo inland to Santo Antonio. Other large contracts included orders by the Ministry of Transportation and Public Works, Brazil, for thirteen 2-8-2 type locomotives placed with the American Locomotive Company and ten 2-8-2 type and three 2-6-6-2 type locomotives placed with the Baldwin Locomotive Works. The Internationl General Electric Company received an order for ten electric switching locomotives from Russia.

Only three locomotives, two Diesel-electric switching units for the Canadian Car and Munitions, Ltd., and one steam unit for the Newfoundland Railway, were reported in Canadian orders during 1940. This compares with 59 locomotives, all steam, reported as booked by Canadian builders and shops during 1939.

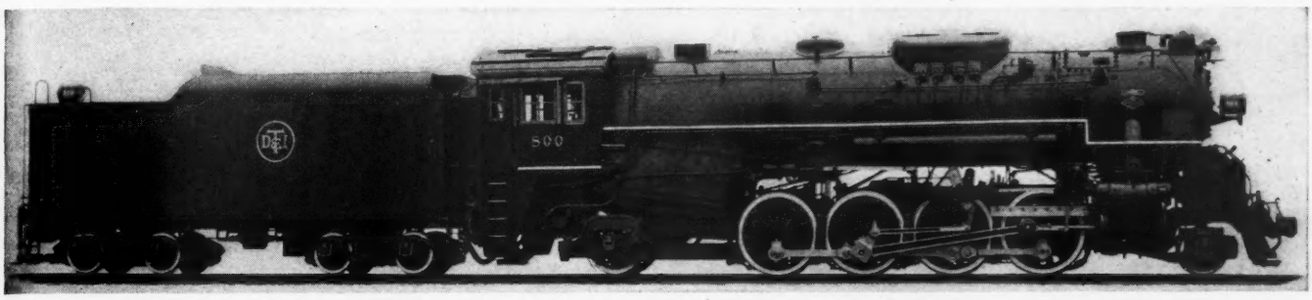
Table IV—Locomotives Built 1929-1940

Year	Domestic	U. S. Export	Canadian	Total
1940	435	66	59	560
1939	338	16	1	355
1938	272	28	46	346
1937	526	44	45 (Inc. Export)	615
1936	157	22	23	202
1935	184	17	4	205
1934	91	19	..	110
1933	57	6	..	63
1932	102	18	3 (Inc. Export)	123
1931	181	17	24	222
1930	972	51	111	1,134
1929	926	139	96	1,161

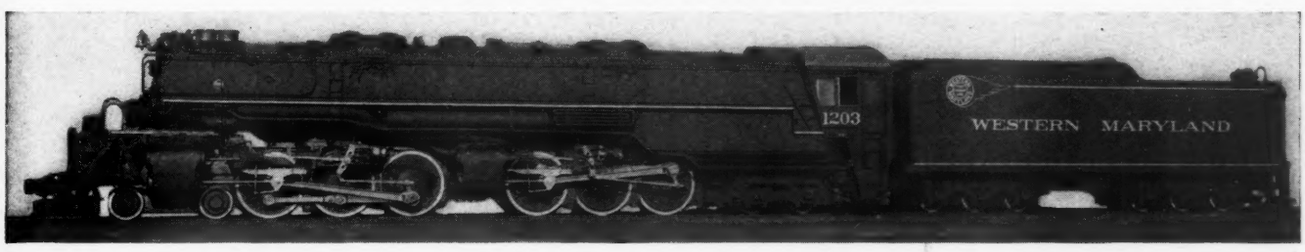
Locomotives built in the United States for domestic service during the year, as distinguished from those ordered, totaled 435 units, of which 172 were steam, 195 Diesel-electric and 68 electric. This compares with 338 built in 1939, 83 steam, 234 Diesel-electric and others and 21 electric. Locomotives built for export totaled 66, an increase of 50 units compared with 1939 and the largest yearly production for foreign carriers since 1929. Of the 66 built for export, 61 were steam, four Diesel-electric and one electric as compared with 1939 production of eight steam, four Diesel-electric and four electric. Canadian builders turned out 59 units, 55



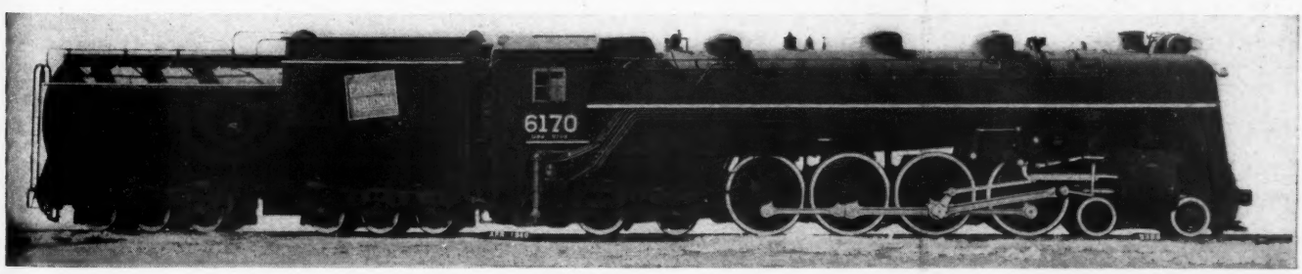
2,000-Hp. Diesel-Electric Locomotive Built by the American Locomotive Company With G. E. Electrical Equipment



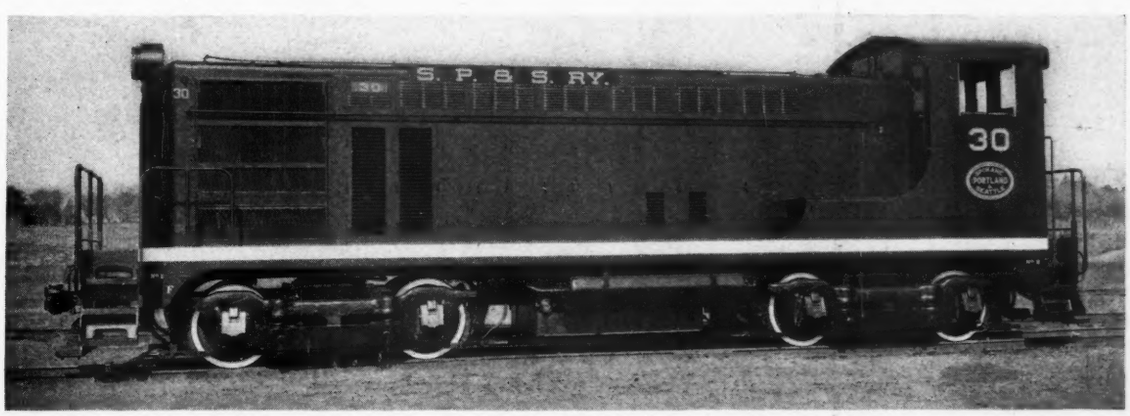
One of Four Locomotives Just Completed by the Lima Locomotive Works for the Detroit, Toledo & Ironton



Twelve Locomotives of This Type Were Ordered from the Baldwin Locomotive Works by the Western Maryland



The Montreal Locomotive Works Delivered 15 Locomotives of this Design to the Canadian National



Diesel-Electric 1,000-Hp. Switching Locomotive Built by the Baldwin Locomotive Works

steam and 4 Diesel-electric, as compared with only one (steam) in 1939.

Statistics of locomotives ordered differ from totals of locomotives actually built in that the latter will include locomotives, orders for which were placed during the closing months of the preceding year. Further, construction may not have been completed or, in certain instances, started on orders placed at the end of the current year.

The increase in number of locomotive purchases this year has no doubt been affected in some degree by the steady reduction in number of locomotives in service that has been taking place for a long span of years. Although many of these reductions have been made possible by the replacement of old and obsolete engines with new ones of greater power and efficiency, more intensive locomotive utilization and reduced traffic, nevertheless the proportion of under-age units has become constantly smaller. An expected greater demand for railway transportation which will be augmented by national defense program requirements, the need of providing an adequate supply of units capable of meeting modern operating requirements and the favorable trend of railroad earnings would all appear to point toward continued substantial purchases of locomotives during 1941.

The following listing of locomotive orders placed during year 1940 showing purchaser, builder and descriptive data is based on information supplied by the railways and other purchasers in response to inquiries from the *Railway Age*. Data have been checked against similar lists furnished through the co-operation of the builders and further amplified by reference to weekly reports appearing in the Equipment & Supplies column of the *Railway Age*. While the information set forth is believed to be reliable, the *Railway Age* does not guarantee the statistical accuracy or completeness of the tables or totals drawn therefrom. The statistics are intended to permit comparisons of this year's business with that of preceding years and it is felt the results shown satisfy this requirement to all practical purposes.

Semi-annual reports of locomotive installations and retirements made by the Car Service Division of the Association of American Railroads will not agree with *Railway Age* totals of locomotives ordered and built, inasmuch as the Car Service Division totals cover only Class I carriers, whereas *Railway Age* totals cover all carriers and industrial users.

Steam Locomotive Orders in 1940

For Service in the United States

Purchaser	No.	Type	Service	Weight	Tractive force	Cylinders	Date of order	Date of delivery	Builder
Akron, Canton & Youngstown, No. Ohio	2	2-8-2	Freight	313,700	53,800	26 x 30	July	Jan. '41	Lima
Alaska	1	4-6-2	Pass. & Frt	242,000	36,500	22 x 28	July	Jan. '41	Baldwin
Atchison, Topeka & Santa Fe	10	4-8-4	Pass.	511,000	66,000	28 x 32	July	Feb.-May 41	Baldwin
Bessemer & Lake Erie	2	0-8-0	Sw.	279,000	64,309	25 x 30	November	.....	American
	5	2-10-4	Freight	520,000	109,935†	31 x 32	November	.....	Baldwin
Boston & Maine	5	4-8-2	Freight	420,260	67,000	28 x 31	September	Apr. '41	Baldwin
Chesapeake & Ohio	10	2-6-6-6	Freight	695,000	110,200	22½ x 33 (4 cyl.)	September	May '41	Lima
Chicago, Milw., St. P. & Pac.	10	4-8-4	Freight	468,000	68,331	26 x 32	Sept. '39	March-May	Baldwin
Delaware & Hudson	20	4-6-6-4	Freight	597,000	94,400	20½ x 32 (4 cyl.)	January	June-Aug.	American
Detroit, Toledo & Ironton	4	2-8-2	Freight	364,000	55,600	23 x 30	June	November	Lima
Duluth, Missabe & Iron Range	8	2-8-8-4	Freight	712,000	140,000	26 x 32 (4 cyl.)	August	Apr. '41	Baldwin
Jones & Laughlin Steel Corp.	1	.....	Freight	118,000	26,200	18 x 20	September	.....	American
	1	.....	Freight	93,000	16,700	15 x 16	October	.....	Porter
	1	.....	Freight	102,000	23,790	18 x 24	1940	1940	Baldwin
New York Central	25	4-8-2	Frt. & Pass.	388,500	60,100	25½ x 30	April	Oct.-Dec.	American
	10	4-8-2	Freight	393,500	74,100†	25½ x 30	April	Dec.-Jan. '41	American
	15	4-8-2	Freight	392,000	74,100†	25½ x 30	April	Nov.-Dec.	Lima
Norfolk & Western	4	4-8-4	Pass.	494,000	73,300	27 x 32	September	1941	Company Shops
	1	4-8-4	Pass.	503,000	85,800†	27 x 32	September	1941	Company Shops
Northern Pacific	8	4-8-4	Pass.	492,300	69,800	28 x 31	November	.....	Baldwin
	6	4-6-6-4	Freight	640,000	.....	23 x 32 (4 cyl.)	November	.....	American
Pennsylvania	2	4-4-4-4	Pass.	501,500	78,500†	19¾ x 26 (4 cyl.)	July	1941	Baldwin
	25*	Tenders	.....	.....	.....	.....	June	Mar. '41	Company Shops
St. Louis-San Francisco	3	4-8-4	Pass.	360,960	55,400†	26 x 28	January	Mar. '41	Company Shops
	5	4-8-2	Freight	419,200	77,350	29 x 32	July	June '41	Company Shops
Southern Pacific	20	4-8-4	Pass.	469,000	79,660†	25½ x 32	July	Feb.-Apr. '41	Lima
Terminal Ry., Alabama State Docks	1	0-6-0	Sw.	164,000	41,200	21 x 28	August	December	American
Union Pacific	15	4-8-8-4	Freight	.....	135,700	23¾ x 32	December	1941	American
Western Maryland	12	4-6-6-4	Freight	604,000	95,500†	22 x 32 (4 cyl.)	June	Nov.-Feb. '41	Baldwin
Wheeling & Lake Erie	4	0-6-0	Sw.	167,850	39,102	21 x 28	Dec. '39	Mar.-May	Company Shops
	7	2-8-4	Freight	408,000	64,100	25 x 34	October	Feb. '41	American
Youngstown Sheet & Tube	1	0-4-0	Sw.	84,000	18,620	21 x 19	November	Feb '41	Heisler

United States—Export

Purchaser	No.	Type	Service	Weight	Tractive force	Cylinders	Date of order	Date of delivery	Builder
Brazil & Bolivia	4	2-6-0	Freight	178,000	233,000	15 x 22	September	.....	Vulcan
Brazilian Government	5	2-8-2	.....	124,000	.....	16 x 22	November	.....	American
	8	2-8-2	.....	115,000	.....	16 x 20	November	.....	American
	3	2-6-6-2	Freight	144,600	29,950	14 x 22 (4 cyl.)	November	.....	Baldwin
	10	2-8-2	Freight	115,000	19 580	16 x 20	November	.....	Baldwin
Chilean State Rys.	10	4-8-2	.....	329,000	.....	25 x 30	January	.....	American
Estrada De Ferro de Goiaz (Brazil)	1	4-6-0	Frt. & Pass.	80,000	15,100	14 x 20	April	August	Baldwin
Guayaquil & Quito (Ecuador)	2	2-8-0	Freight	123,000	32,150	19 x 22	May	.....	Baldwin
Sanchoku Development (Korea)	6	2-8-2	.....	208,000	.....	21 x 28	May	.....	American
Sao Paulo-Parana (Brazil)	1	2-8-2	Freight	144,500	27,100	19 x 24	July	.....	Baldwin
	1	2-8-2	Freight	144,500	27,100	19 x 24	November	.....	Baldwin
United Fruit Company	4	2-8-2	Freight	125,000	22,900	16 x 20	April	October	Baldwin

* Not included in totals.
† Tractive force including booster.

Canada—Export

Purchaser	No.	Type	Service	Weight	Tractive force	Cylinders	Date of order	Date of delivery	Builder
Newfoundland Ry.	1	2-8-2	.....	149,000	.....	18 x 24	November	.....	Montreal

Electric Locomotives

For Service in the United States

Purchaser	No.	Wheel arrangement	Service	Weight	Horsepower	Date of order	Date of delivery	Builder Electrical Equipment—Locomotive
Illinois Terminal	1	2(B-B)	Freight	210,900	1,800	May	December	West.-Co. Shops
Nevada Cons. Copper Corp.	1	B+B	Freight	170,000	970	June	October	General Electric
	2	B+B	Freight	170,000	970	October	Apr. '41	General Electric
Phelps Dodge Corp.	9	B-B	Freight	258,600	840	August	.....	West.-Baldwin

Export

Purchaser	No.	Wheel arrangement	Service	Weight	Horsepower	Date of order	Date of delivery	Builder Electrical Equipment—Locomotive
E. de F. Sorocabana (Brazil)	20	.....	Pass. & Frt.	.....	.....	October	1941-42	Electrical Exp. Corp. (Intl. G.E.-West. Intl.)
U.S.S.R.	10	B	Sw.	70,000	250	October	Mar. '41	General Electric

Diesel-Electric, Gas-Electric and Other Internal-Combustion Locomotives

For Service in the United States

Purchaser	No.	Wheel arrangement	Service	Type	Weight	Horsepower	Date of order	Date of delivery	Builder Electrical Equipment-Locomotive Builder-Engine Builder
Aluminum Co. of America	1	B-B	Sw.	Diesel-Elec.	130,000	350	September	March	G.E.-Cummins
American Steel & Wire Co.	1	B-B	Sw.	Diesel-Elec.	200,000	660	November	.....	West.-Baldwin
	1	B-B	Sw.	Diesel-Elec.	.....	660	November	.....	G. E.-American
Arkansas Valley	2	B-B	Sw.	Diesel-Elec.	88,000	380	July	September	G. E. Cater.
Atchison, Topeka & Santa Fe	2	C-C	Pass.	Diesel-Elec.	313,300	2,000	February	May	Electro-Motive
	1	2(C-C)	Pass.	Diesel-Elec.	616,300	4,000	Feburary	April	Electro-Motive
	4	B-B	Freight	Diesel-Elec.	428,000	2,700	September	Dec. '41	Electro-Motive
	1	2(C-C)	Pass.	Diesel-Elec.	616,300	4,000	November	1941	Electro-Motive
	1	2(C-C)	Pass.	Diesel-Elec.	600,000	4,000	October	Mar. '41	G. E.-American
	1	B-B	Sw.	Diesel-Elec.	88,000	360	September	Jan. '41	West.-D. B.-Cater.
	1	B-B	Sw.	Diesel-Elec.	88,000	360	September	Jan. '41	West.-Whit.-Cater.
	1	B-B	Sw.	Diesel-Elec.	240,000	1,000	October	.....	West.-Baldwin
Atlantic Coast Line	1	B-B	Sw.	Diesel-Elec.	229,000	1,000	January	January	West.-American
	1	B-B	Sw.	Diesel-Elec.	247,900	1,000	January	January	Electro-Motive
	14	C-C	Pass.	Diesel-Elec.	313,300	2,000	July	Nov.-Jan.'41	Electro-Motive
	4	C-C	Pass.	Diesel-Elec.	303,600	2,000	July	Nov.-Jan.'41	Electro-Motive
Baltimore & Ohio	3	2(C-C)	Pass.	Diesel-Elec.	616,300	4,000	July	October	Electro-Motive
	1	C-C	Pass.	Diesel-Elec.	313,300	2,000	July	October	Electro-Motive
	16	B-B	Sw.	Diesel-Elec.	198,000	600	July	November	Electro-Motive
	9	B-B	Sw.	Diesel-Elec.	250,000	1,000	July	September	Electro-Motive
Bethlehem Steel Co.	1	B	Sw.	Diesel-Elec.	100,000	300	Dec. '39	Dec. '39	G. E.-Cummins
Birmingham Southern	1	B-B	Sw.	Diesel-Elec.	.....	1,000	November	.....	West.-American
Boston & Maine	4	B-B	Sw.	Diesel-Elec.	88,000	380	July	November	G. E.-Cater.
Buffalo Creek	1	B-B	Sw.	Diesel-Elec.	196,400	600	March	March	Electro-Motive
	1	B-B	Sw.	Diesel-Elec.	197,500	660	March	March	G. E.-American
Central of Georgia	1	B-B	Sw.	Diesel-Elec.	250,000	1,000	November	1941	Electro-Motive
	2	B-B	Sw.	Diesel-Elec.	198,000	600	November	1941	Electro-Motive
	1	B-B	Sw.	Diesel-Elec.	.....	660	December	.....	G. E.-American
	1	B-B	Sw.	Diesel-Elec.	.....	1,000	December	.....	G. E.-American
Charles City Western Ry.	1	B	Sw.	Diesel-Elec.	46,000	150	October	Jan. '41	G. E.-Cummins
Chattanooga Traction Co.	2	B-B	Sw.	Diesel-Elec.	88,000	380	September	Feb. '41	G. E.-Cater.
Chicago, Burlington & Quincy	1	C-C	Pass.	Diesel-Elec.	313,300	2,000	July	October	Electro-Motive
	7	B-B	Sw.	Diesel-Elec.	198,000	600	April	June	Electro-Motive
	2	B-B	Sw.	Diesel-Elec.	250,000	1,000	April	April	Electro-Motive
Chicago, Milwaukee, St. P. & Pac.	12	B-B	Sw.	Diesel-Elec.	198,000	600	March	May	Electro-Motive
	2	B-B	Sw.	Diesel-Elec.	199,000	660	March	April	G. E.-American
	1	B-B	Sw.	Diesel-Elec.	230,000	1,000	March	April	G. E.-American
	1	B-B	Sw.	Diesel-Elec.	199,000	660	March	May	West.-Baldwin
	1	B-B	Sw.	Diesel-Elec.	88,000	360	March	October	Whitcomb(B)
	1	B-B	Sw.	Diesel-Elec.	89,000	380	March	September	G. E.-Cater.
	9	B-B	Sw.	Diesel-Elec.	198,000	600	September	November	Electro-Motive
	3	B-B	Sw.	Diesel-Elec.	250,000	1,000	September	November	Electro-Motive
	4	B-B	Sw.	Diesel-Elec.	230,100	1,000	September	October	G. E.-American
	2	B-B	Sw.	Diesel-Elec.	240,000	1,000	September	October	West.-Baldwin
Chicago, Rock Island & Pacific	2	1-B-3	Pass.	Diesel-Elec.	250,000	1,000	May	June	Electro-Motive
	3	1B-1B	Pass.	Diesel-Elec.	313,300	2,000	May	June	Electro-Motive
	2	1B-1B	Pass.	Diesel-Elec.	330,000	2,000	August	December	G. E.-American
	2	B-B	Frt. & Sw.	Diesel-Elec.	240,000	1,000	August	Jan. '41	G. E.-American
	1	C	Sw.	Diesel-Mech.	60,300	180	August	November	Dav.-Besler
	1	A1A-A1A	Pass.	Diesel-Elec.	.....	2,000	October	.....	G. E.-American
	1	B-B	Sw	Diesel-Elec.	.....	900	April	.....	G. E.-American
Chicago, St. Paul, Minn. & Omaha	1	B-B	Sw.	Diesel-Elec.	.....	1,000	August	.....	G. E.-American
	1	B-B	Sw.	Diesel-Elec.	198,000	600	August	October	Electro-Motive
	1	B-B	Sw.	Diesel-Elec.	250,000	1,000	August	December	Electro-Motive
Cincinnati N.O. & Tex. Pacific	2	2(A1A-A1A)	Pass.	Diesel-Elec.	650,000	4,000	November	Jan.-Feb.'41	G. E.-American
Colorado & Southern	1	2(C-C)	Pass.	Diesel-Elec.	626,410	4,000	February	May	Electro-Motive
Colorado Fuel & Iron Co.	1	B	Sw.	Diesel-Elec.	88,000	300	May	October	G. E.-Cummins
Delaware, Lackawanna & Western	11	B-B	Sw.	Diesel-Elec.	198,000	600	March	May	Electro-Motive
	3	B-B	Sw.	Diesel-Elec.	197,500	660	March	April	G. E.-American
Des Moines Union	3	B-B	Sw.	Diesel-Elec.	.....	660	April	.....	G. E.-American
DuPont de Nemours Co., E. I.	2	B-B	Sw.	Diesel-Elec.	90,000	300	July	July-Aug.	G. E.-Cummins
	2	B-B	Sw.	Diesel-Elec.	90,000	300	August	Oct.-Nov.	G. E.-Cummins
	1	B-B	Sw.	Diesel-Elec.	130,000	350	October	December	G. E.-Cummins
East Erie Commercial	1	B-B	Sw.	Diesel-Elec.	130,000	350	August	Apr. '41	G. E.-Cummins
Elgin, Joliet & Eastern	2	B-B	Sw.	Diesel-Elec.	196,410	660	September	September	G. E.-American
	6	B-B	Sw.	Diesel-Elec.	198,000	600	September	Sept.-Oct.	Electro-Motive
	1	B-B	Sw.	Diesel-Elec.	200,500	660	September	September	West.-Baldwin
	2	B-B	Sw.	Diesel-Elec.	200,000	660	.....	September	West.-Baldwin
	2	B-B	Sw.	Diesel-Elec.	249,990	1,000	September	September	Electro-Motive
	2	B-B	Sw.	Diesel-Elec.	231,400	1,000	September	September	G. E.-American
	3	B-B	Sw.	Diesel-Elec.	.....	660	November	.....	G. E.-American
	2	B-B	Sw.	Diesel-Elec.	250,000	1,000	November	Dec. '41	Electro-Motive
	2	B-B	Sw.	Diesel-Elec.	.....	1,000	November	.....	G. E.-American
	1	B-B	Sw.	Diesel-Elec.	240,000	1,000	November	.....	West.-Baldwin
	7	B-B	Sw.	Diesel-Elec.	198,000	600	December	Dec. '41	Electro-Motive

Purchaser	No.	Wheel arrangement	Service	Type	Weight	Horsepower	Date of order	Date of delivery	Builder Electrical Equipment-Locomotive Builder-Engine Builder
Florida East Coast	1	C-C	Pass.	Diesel-Elec.	313,300	2,000	August	December	Electro-Motive
Fort Worth & Denver City	1	2(C-C)	Pass.	Diesel-Elec.	626,440	4,000	February	May	Electro-Motive
G. E. Co., Pittsfield	1	B-B	Sw.	Diesel-Elec.	100,000	300	October	Jan. '41	G. E.-Cummins
Great Northern	2	B-B	Sw.	Diesel-Elec.	88,000	380	March	October	G. E.-Cater
	1	B-B	Sw.	Diesel-Elec.	250,000	1,000	July	September	Electro-Motive
	2	2(B-B)	Pass. & Frt.	Diesel-Elec.	428,000	2,700	October	Feb. '41	Electro-Motive
Gulf, Mobile & Ohio	2	A1A-A1A	Pass.	Diesel-Elec.	317,000	2,000	March	October	G. E.-American
	4	B-B	Sw.	Diesel-Elec.	199,000	660	November	December	G. E.-American
Hammermill Paper Co.	1	B-B	Sw.	Diesel-Elec.	130,000	350	March	August	G. E.-Cummins
Hanna Furnace	2	B-B	Sw.	Diesel-Elec.	198,000	600	August	September	Electro-Motive
Houston Belt & Terminal	1	B-B	Sw.	Diesel-Elec.	198,000	600	February	March	Electro-Motive
Illinois Central	1	C-C	Pass.	Diesel-Elec.	313,000	2,000	August	October	Electro-Motive
	1	2(B-B)	Tr.	Diesel-Elec.	493,790	2,000	August	December	Electro-Motive
	1	B-B	Sw.	Diesel-Elec.	250,000	1,000	August	December	Electro-Motive
	2	2(B-B)	Tr.	Diesel-Elec.	414,200	2,700	August	Jan. '41	Electro-Motive
Inland Steel	1	B-B	Sw.	Diesel-Elec.	198,000	600	November	November	Electro-Motive
	1	B-B	Sw.	Diesel-Elec.	.....	660	November	.....	G. E.-American
Kansas City Southern	1	C-C	Pass.	Diesel-Elec.	313,300	2,000	January	June	Electro-Motive
Kansas City Terminal	2	B-B	Sw.	Diesel-Elec.	220,000	1,000	October	November	G. E.-American
	1	B-B	Sw.	Diesel-Elec.	185,000	660	October	November	G. E.-American
Kewaunee, Green Bay & Western	1	B-B	Sw.	Diesel-Elec.	194,000	660	November	December	G. E.-American
Lake Champlain & Moriah	1	B-B	Sw.	Diesel-Elec.	250,000	1,000	June	August	Electro-Motive
Lehigh Valley	1	B-B	Sw.	Diesel-Elec.	200,000	660	February	.....	West.-American
	3	B-B	Sw.	Diesel-Elec.	198,000	600	January	February	Electro-Motive
Lone Star Cement Corp.	1	B	Sw.	Diesel	51,500	175	Oct. '39	January	Vulcan-Cater
Manufacturers Ry. Co.	2	B-B	Sw.	Diesel-Elec.	.....	1,000	April	.....	G. E.-American
	1	B-B	Sw.	Diesel-Elec.	.....	1,000	October	.....	G. E.-American
	1	B-B	Sw.	Diesel-Elec.	.....	1,000	February	.....	G. E.-American
Massena Terminal	1	B-B	Sw.	Diesel-Elec.	.....	660	November	.....	G. E.-American
Michigan Lime & Chemical Co.	4	B-B	Sw.	Diesel-Elec.	.....	1,000	January	.....	G. E.-American
Minneapolis & St. Louis	1	B-B	Sw.	Diesel-Elec.	225,200	1,000	March	April	West.-Baldwin
	1	B-B	Sw.	Diesel-Elec.	250,000	1,000	July	August	Electro-Motive
Minneapolis, Northfield & South.	1	B-B	Sw.	Diesel-Elec.	200,000	660	July	July	West.-Baldwin
Mississippi Export	1	B-B	Sw.	Diesel-Elec.	88,000	380	July	October	G. E.-Cater
Missouri Pacific	2	B-B	Sw.	Diesel-Elec.	88,000	380	May	December	G. E.-Hercules
	1	B-B	Sw.	Diesel-Elec.	88,000	380	May	December	West.-Port.-Her.
	1	B-B	Sw.	Diesel-Elec.	88,000	380	May	December	West.-D. B.-Her.
	1	B-B	Sw.	Diesel-Elec.	88,000	380	May	November	West.-Whit.-Her.
	1	B-B	Sw.	Diesel-Elec.	198,080	600	May	August	Electro-Motive
	2	B-B	Sw.	Diesel-Elec.	194,080	660	May	August	G. E.-American
	2	B-B	Sw.	Diesel-Elec.	199,355	660	May	August	West.-Baldwin
	1	B-B	Sw.	Diesel-Elec.	250,300	1,000	May	August	Electro-Motive
	1	C-C	Pass.	Diesel-Elec.	247,340	1,000	May	August	Electro-Motive
Monongahela Connecting	2	B-B	Sw.	Oil-Elec.	190,000	750	October	Feb. '41	G. E.-Cooper-Bess.
Newburgh & South Shore	1	B-B	Sw.	Diesel-Elec.	218,000	1,000	July	July	West.-American
	2	B-B	Sw.	Diesel-Elec.	.....	660	November	.....	G. E.-American
New Jersey, Indiana & Illinois	1	B-B	Sw.	Diesel-Elec.	.....	660	June	.....	G. E.-American
Newport News Shipbldg. Co.	1	B-B	Sw.	Diesel-Elec.	90,000	300	July	July	G. E.-Cummins
New York Central	9	B-B	Sw.	Diesel-Elec.	.....	660	December	1941	G. E.-American
	26	B-B	Sw.	Diesel-Elec.	198,000	600	December	1941	Electro-Motive
N. Y., New Haven & Hartford	1	B-B	Sw.	Diesel-Elec.	88,000	380	November	December	G. E.-Cater
Northeast Oklahoma	1	....	....	Diesel-Elec.	160,000	500	November	Mar. '41	G. E.-Cummins
Northern Pacific	3	B-B	Sw.	Diesel-Elec.	250,000	1,000	January	February	Electro-Motive
	3	B-B	Sw.	Diesel-Elec.	198,000	660	January	March	G. E.-American
	1	B-B	Sw.	Diesel-Elec.	199,265	660	January	April	West.-Baldwin
Northern Pacific Term. of Ore.	2	B-B	Sw.	Diesel-Elec.	.....	660	June	.....	G. E.-American
Oliver Iron Mining Co.	3	B-B	Sw.	Diesel-Elec.	240,000	1,000	January	July-Aug.	West.-Baldwin
	7	B-B	Sw.	Diesel-Elec.	245,000	1,000	January	.....	G. E.-American
Patapsco & Back Rivers	2	B-B	Sw.	Diesel-Elec.	240,000	1,000	December	.....	West.-Baldwin
Phelps Dodge	2	B-B	Sw.	Diesel-Elec.	250,000	1,000	August	October	Electro-Motive
Phila., Bethlehem & New England	2	B-B	Sw.	Diesel-Elec.	198,000	600	August	August	Electro-Motive
	1	B-B	Sw.	Diesel-Elec.	198,000	600	June	June	Electro-Motive
	2	B-B	Sw.	Diesel-Elec.	198,000	600	November	December	Electro-Motive
Pittsburgh Limestone Corp.	5	B	Sw.	Diesel-Elec.	70,000	320	August	Feb. '41	G. E.-Cummins
Reading Co.	4	B-B	Sw.	Diesel-Elec.	198,000	600	July	August	Electro-Motive
	3	B-B	Sw.	Diesel-Elec.	194,000	660	July	September	G. E.-American
	3	B-B	Sw.	Diesel-Elec.	199,265	660	July	Sept.-Oct.	West.-Baldwin
	2	B-B	Sw.	Diesel-Elec.	245,450	1,000	July	August	West.-Baldwin
	1	B-B	Sw.	Diesel-Elec.	250,000	1,000	July	August	Electro-Motive
Republic Steel Corp.	1	B	Sw.	Diesel-Mech.	90,000	340	June	August	Fate R.H.-Cooper-Bess.
	1	B	Sw.	Diesel-Mech.	90,000	340	October	December	Fate R.H.-Cooper-Bess.
	1	C	Sw.	Diesel-Mech.	130,000	340	December	Jan. '41	Fate R.H.-Cooper-Bess.
	1	B-B	Sw.	Diesel-Elec.	130,000	350	June	August	G. E.-Cummins
Richmond Terminal	1	B-B	Sw.	Diesel-Elec.	198,000	600	February	March	Electro-Motive
Rio Grande & Eagle Pass	1	C	Frt. & Sw.	Gas.-Mech.	70,000	250	July	September	Fate R. H.-Le Roi
River Terminal	1	B-B	Sw.	Diesel-Elec.	.....	660	December	.....	G. E.-American
St. Johns River Terminal	1	B-B	Sw.	Diesel-Elec.	198,000	600	June	July	Electro-Motive
	1	B-B	Sw.	Diesel-Elec.	250,000	1,000	June	July	Electro-Motive
Sanderson & Porter	2	B-B	Sw.	Diesel-Elec.	90,000	300	November	Mar. '41	G. E.-Cummins
Seaboard Air Line	1	C-C	Pass.	Diesel-Elec.	313,300	2,000	August	October	Electro-Motive
	1	B-B	Sw.	Diesel-Elec.	.....	660	November	.....	G. E.-American
	1	B-B	Sw.	Diesel-Elec.	200,000	660	November	.....	West.-Baldwin
Semmett-Solvay Co.	2	B-B	Sw.	Diesel-Elec.	160,000	500	August	Feb. '41	G. E.-Cummins
South Buffalo	1	B-B	Sw.	Diesel-Elec.	.....	660	August	.....	G. E.-American
	1	B-B	Sw.	Diesel-Elec.	.....	1,000	August	.....	G. E.-American
	3	B-B	Sw.	Diesel-Elec.	.....	660	December	.....	G. E.-American
Southern	3	C-C	Pass.	Diesel-Elec.	313,300	2,000	October	Mar. '41	Electro-Motive
	2	2(C-C)	Pass.	Diesel-Elec.	616,300	4,000	October	Mar. '41	Electro-Motive
	2	2(C-C)	Pass.	Diesel-Elec.	616,300	4,000	November	Mar. '41	Electro-Motive
	5	B-B	Sw.	Diesel-Elec.	250,000	1,000	September	December	Electro-Motive
	3	B-B	Sw.	Diesel-Elec.	198,000	600	September	November	Electro-Motive
	2	B-B	Sw.	Diesel-Elec.	199,000	660	September	October	G. E.-American
Spokane, Portland & Seattle	2	B-B	Freight	Diesel-Elec.	230,000	1,000	June	October	G. E.-American
	2	B-B	Freight	Diesel-Elec.	240,000	1,000	June	November	West. Baldwin
Standard Steel Works	1	B-B	Sw.	Diesel-Elec.	200,000	660	July	July	West.-Baldwin
Stone & Webster	4	B-B	Sw.	Diesel-Elec.	90,000	300	October	December	G. E.-Cummins
Terminal R.R. Assoc. of St. Louis	4	B-B	Sw.	Diesel-Elec.	198,000	600	May	June	Electro-Motive
	2	B-B	Sw.	Diesel-Elec.	250,000	1,000	May	June	Electro-Motive
	2	B-B	Sw.	Diesel-Elec.	194,000	660	May	July	G. E.-American
	2	B-B	Sw.	Diesel-Elec.	199,265	660	June	July	West.-Baldwin
Tex.Pac.-Mo.Pac.Ter.RR of N.O.	1	B-B	Sw.	Diesel-Elec.	.....	660	November	.....	G. E.-American
Union Railroad Co.	2	B-B	Sw.	Diesel-Elec.	240,000	1,000	July	September	West.-Baldwin
Union Pacific	10	B-B	Sw.	Diesel-Elec.	250,000	1,000	April	May	Electro-Motive
	3	C-C	Pass.	Diesel-Elec.	616,300	4,000	July	August	Electro-Motive
	2	C-C	Pass.	Diesel-Elec.	929,600	6,000	August	1941	Electro-Motive
	5	B-B	Sw.	Diesel-Elec.	250,000	1,000	July	July	Electro-Motive
	10	B-B	Sw.	Diesel-Elec.	250,000	1,000	December	1941	Electro-Motive
United States Navy Dept.	1	B-B	Sw.	Diesel-Elec.	160,000	500	February	July	G. E.-Cummins
	1	B-B	Sw.	Diesel-Elec.	90,000	300	July	October	G. E.-Cummins
	1	B-B	Sw.	Diesel-Elec.	100,000	300	August	December	G. E.-Cummins
United States War Dept.	1	B-B	Sw.	Diesel-Elec.	86,000	300	April	November	G. E.-Cummins
	1	B-B	Sw.	Diesel-Elec.	130,000	350	August	November	G. E.-Cummins
	1	B-B	Sw.	Diesel-Elec.	90,000	300	September	December	G. E.-Cummins
	1	B-B	Sw.	Diesel-Elec.	130,000	350	October	Mar. '41	G. E.-Cummins
	2	B-B	Sw.	Diesel-Elec.	.....	660	December	.....	G. E.-American

Purchaser	No.	Wheel arrangement	Service	Type	Weight	Horsepower	Date of order	Date of delivery	Builder Electrical Equipment-Locomotive Builder-Engine Builder
Uvalde Rock Asphalt	1	B-B	Sw.	Diesel-Elec.	86,000	300	March	April	G. E.-Cummins
Wabash	1	B-B	Sw.	Diesel-Elec.	198,000	600	February	February	Electro-Motive
	1	B-B	Sw.	Diesel-Elec.	197,500	660	February	February	G. E.-American
	1	B-B	Sw.	Diesel-Elec.	198,000	600	April	May	Electro-Motive
	1	B-B	Sw.	Diesel-Elec.	198,800	600	September	November	Electro-Motive
Wheeling & Lake Erie	1	B-B	Sw.	Diesel-Elec.	250,000	1,000	February	April	Electro-Motive
	1	B-B	Sw.	Diesel-Elec.	250,000	1,000	June	July	Electro-Motive
Winona R. R.	1	B	Frt. & Sw.	Diesel-Mech.	90,000	340	Dec. '39	February	Fate R. H.-Cooper-Bess.
Worth Steel Co.	2	B-B	Sw.	Diesel-Elec.	130,000	350	July	September	G. E.-Cummins
Wyandotte Terminal	1	B-B	Sw.	Diesel-Elec.	130,000	350	October	Mar. '41	G. E.-Cummins
Youngstown & Northern	1	B-B	Sw.	Diesel-Elec.	.....	1,000	December	.....	G. E.-American
Canada									
Canadian Car & Munitions, Ltd.	2	B-B	Sw.	Diesel-Elec.	86,000	300	September	November	G. E.-Cummins

Moderate Increase Shown in Construction

(*Continued from page 83*)

abandonments for 1940 were 1,273 miles more than the mileage of new lines completed during the year.

The largest single abandonment, as well as the largest abandonment of an entire line, was that of the Tonopah & Tidewater between Crucero, Cal., and Beatty, Nev., 143 miles. The second largest abandonment was that of a branch of the Minneapolis & St. Louis, between Conde, S. D., and Akaska, 103 miles. The Norfolk Southern stood third with 50 miles between Suffolk, Va., and Edenton, N. C., and the Chicago, Rock Island & Pacific was in fourth place with the abandonment of 49 miles between Cameron Junction, Mo., and Beverly. The second largest abandonment of a single road was that of the Carleton & Coast, 20.4 miles; and the Mound City & Eastern was third with 18 miles. It is significant that 13 entire railways were abandoned during 1940. This compares with 17 complete abandonments in 1939, the largest for any single year. The abandonments reported in any year include all lines abandoned permanently during that year, regardless of whether the tracks have been taken up at the end of the year and are not included in later years when the tracks are actually taken up.

Abandonments were not recorded prior to 1917, for the few lines that were abandoned from time to time were unimportant and usually were in sparsely populated sections, being generally logging roads or those serving mines, while they occurred so infrequently as to attract little attention. Beginning with 1917, however, in which year 942 miles of main lines were abandoned, abandonments have continued on a large scale ever since, the mileage abandoned in individual years having ranged from 282 in 1927 to 1,995 in 1934. During this 24-year period beginning with 1917, a total of 25,191 miles of lines have been abandoned, an average of more than 1,000 miles annually, while only 10,556 miles of new lines have been constructed, leaving a net decrease of 14,635 miles of road.

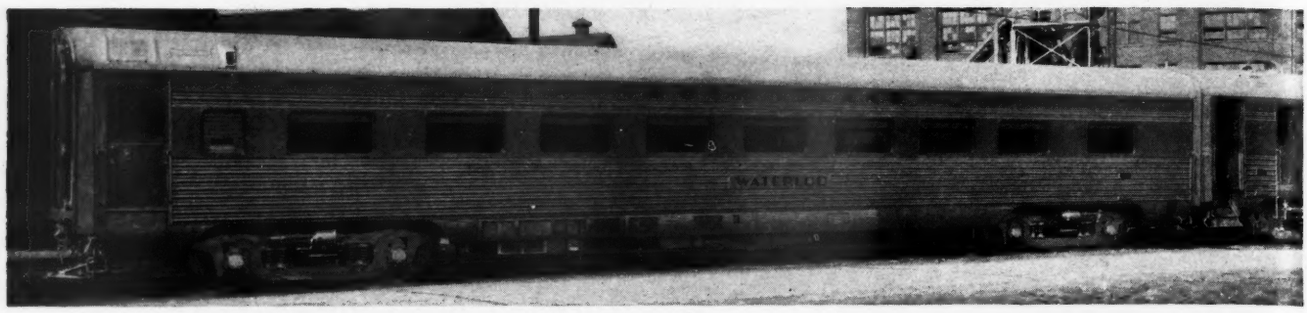
Of equal interest with the mileage abandoned by individual roads and the total for all roads, is the distribution of these abandonments by states, for the states themselves are vitally concerned. During the nine years ending with 1940, a total of 14,807 miles were abandoned in the 48 states and Alaska. During this nine-year period Missouri leads with 856 miles, Texas follows with 802 miles and Iowa ranks third with 758 miles. By regions, the abandonments during these nine years have been: New England states, 761 miles; North Atlantic states, 1,347 miles; Southeastern states, 2,712 miles; Middle Western states, 3,980 miles; Northwestern states, 1,139 miles; Southwestern states, 3,350 miles; and the Pacific Coast states 1,303 miles.

Prior to 1932, abandonments in Canada and Mexico had been negligible. In 1932 and 1933, however, the Canadian roads abandoned a total of 282 miles and since then abandonments have ranged from 55 to 399 miles a year. In 1940 a total of 111 miles were abandoned. No abandonments were reported by the roads in Mexico, although operation is still suspended on several lines.

On pages 83 to 87 is a detailed report by roads of construction projects completed or still in progress during 1940, the individual cost of which approximates or exceeds $100,000, except grade separations which are recorded without regard to cost.

* * * *

A 65-Ton, 350-Hp. Diesel-Electric Locomotive Built by the General Electric Company Switching a Train of Pulp Wood in the Yard of Hammermill Paper Co., Erie, Pa.



Truss-Type Welded Passenger Car With Stainless Steel Sheathing Built by the Pullman-Standard Manufacturing Company

Passenger Cars Ordered in 1940

Total of 284 cars purchased for domestic service is 11 per cent under last year; export orders also lower

By Arthur J. McGinnis

Associate Editor

PASSENGER-train car orders placed with builders and shops for service in the United States during 1940 totaled 284, a decrease of 36 cars or 11 per cent as compared with 1939. This total comprehends all revenue passenger-train cars, including separate members of articulated units, but excluding those containing power plants. These latter are listed and totaled as rail-motor cars.

During 1940 four rail-motor cars were ordered for domestic service, by the Illinois Central. This compares with three ordered in 1939, two by the New York, Susquehanna & Western and one by the Gulf Coast Lines. In addition, 26 rail-motor cars were ordered for export, 22 for service in Colombia and 4 for Brazil. No foreign orders were placed for rail-motor cars in 1939. So-called "cars," devoted entirely to the housing of power plant facilities, and without space for revenue traffic, are listed under "locomotives" elsewhere in this issue.

Table I—Passenger-Train Car Orders in 1940

For service in the United States	284
For export from the United States	21
For service in Canada and export from Canada	65
Grand total	370

Table II—Orders for Passenger-Train Cars 1929-1940

Year	Domestic (A)	U. S. Export	Canadian	Total
1940	284	21	65	370
1939	320	28	87 (Inc. Export)	435
1938	274	..	24	298
1937	679	..	99	778
1936	425	..	10	435
1935	95	..	16	111
1934	388	15	..	403
1933	6	..	..	6
1932	39	..	..	39
1931	11	21	11	43
1930	648	15	203	866
1929	2,322	33	122	2,477

(A)—In certain instances domestic orders placed in December are not reported until following year. Statistics for years 1929-1939 have been revised to eliminate this overlap.

Of the total of 284 cars ordered for domestic service this year, 10 were placed with company shops—four coaches by the Delaware, Lackawanna & Western and four baggage and two baggage-mail cars by the Missouri Pacific. Only one of the 320 cars purchased last year was ordered from a railroad company shop. Large orders placed with builders included 51 air-conditioned cars by the Southern Pacific, 47 cars (41 air-conditioned) by the

Square-End Observation-Lounge Car for the Seaboard Air Line's "Silver Meteor" Built by the Edward G. Budd Manufacturing Co.

Southern and 20 cars by the Atchison, Topeka & Santa Fe. Other orders are listed in detail in the appended tables.

Foreign orders placed with American builders during 1940 totaled 21 passenger-train cars, a decrease of 7 cars as compared with 1939. Prior to 1939 there had been no cars ordered for export during the four-year period 1935-1938 inclusive; 15 were ordered in 1934; and none were ordered in either 1932 or 1933.

Table III—Passenger-Train Cars Built 1929-1940

Year	Domestic	U. S. Export	Canadian	Total
1940	142	28	30	200
1939	194	..	27 (Inc. Export)	221
1938	264	..	38	302
1937	664	..	70	734
1936	142	..	10	152
1935	197	..	..	197
1934	268	15	..	283
1933	6	..	..	6
1932	39	..	..	39
1931	198	21	66	285
1930	1,264	40	210	1,514
1929	1,254	20	162	1,436

Canadian builders and railway shops received orders during the year for 65 cars, comprising 30 for the Canadian National and 35 for the Canadian Pacific; included in these latter are 25 placed with company shops. This compares with 75 cars ordered for service in Canada from Canadian builders in 1939, comprising 65 by the Canadian National and 10 by the Canadian Pacific, and 12 coaches ordered for export.

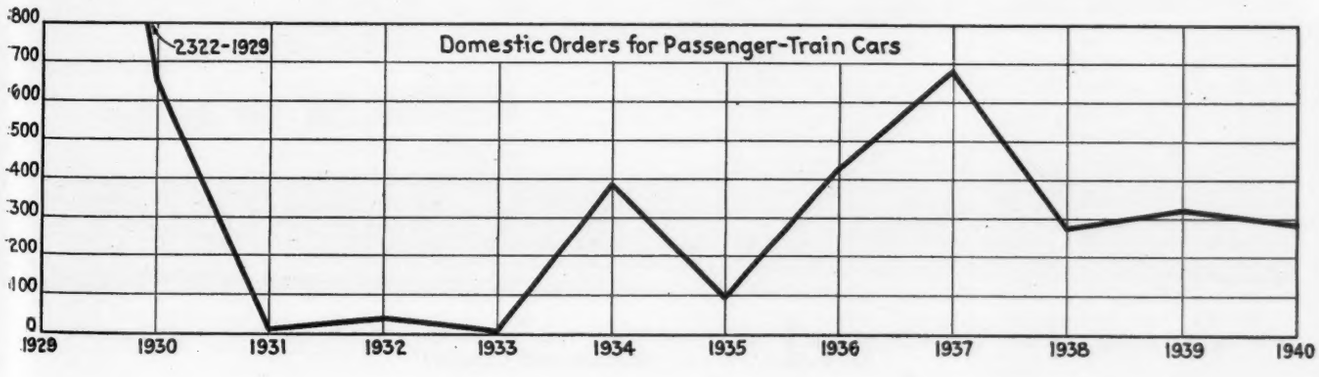
Passenger-train cars built in the United States, as distinguished from those ordered, totaled 142 for domestic service and 28 for export. This compares with 194 built for domestic service in 1939. The 28 units completed for export this year were for service in Portugal; orders for these cars, placed in September 1939, ended the four-year period of complete inactivity in the export field noted above. Canadian builders completed 30 cars during the year as compared with 27 in 1939.

The appended tables of orders placed were compiled from information supplied by the railroads, which has been checked against lists of orders supplied by the car builders, largely through the courtesy of the American Railway Car Institute.

Passenger-Train Car Orders in 1940

For Service in the United States

Purchaser	No.	Class	Length Ft.	Length In.	Seating Capacity	Weight	Date of Order	Date of Delivery	Builder
Atchison, Topeka & Santa Fe	1	Bag. & Mail	63	1¾	..	79,000	November	Feb.-May '41	Budd
	1	Bag. & Mail	73	10	..	85,000	November	Feb.-May '41	Budd
	14	Chair	83	10	52	101,000	November	Feb.-May '41	Budd
	1	Lunch-Ctr.-Diner	83	2	38	117,000	November	Feb.-May '41	Budd
	2	Club-Lounge	79	8	47	102,000	November	Feb.-May '41	Budd
	1	Chair-Obs.	79	11	60	99,000	November	Feb.-May '41	Budd
Atla. & West. Pt.-West. Ry. of Ala.	2	Bag.-Exp.	70	9	..	100,240	June	November	Amer. Car & Fdy.
Atlantic Coast Line	8	Coach	85	0	56	105,750	July	Nov.-Dec.	Budd
	3	Obs.-Tav.	85	0	57	110,000	July	December	Budd
	3	Diner	85	0	48	115,000	July	December	Budd
	3	P. & B.-Dorm.	85	0	22	110,000	July	December	Budd
Chicago, Burlington & Quincy	2	Baggage	88	8	..	92,805	February	June	Budd
	1	Bag.-Mail	72	8	..	90,620	February	June	Budd
	9 AC	Coach	79	8	52	103,480	February	June	Budd
	2 AC	Lounge	88	7	46	116,730	February	June	Budd
Chicago, Rock Island & Pacific	4 AC	Coach	79	8	52	107,456	May	Oct.-Nov.	Pullman-Standard
	2 AC	Coach	83	0	68	109,281	May	Oct.-Nov.	Pullman-Standard
	4 AC	Diner-Obs.	79	8	40	113,438	May	Oct.-Nov.	Pullman-Standard
Colorado & Southern	1	Bag. & Mail	88	8	..	99,385	February	August	Budd
	1	P.-Dorm.-Exp.	88	8	16	111,720	February	August	Budd
	1	Diner-Lounge	88	7	55	128,875	February	August	Budd
Delaware, Lackawanna & Western	1	Coach	70	6	50	139,700	January	June	Company Shops
	2	Coach	70	6	50	139,700	January	June	Company Shops
	1	Coach	70	6	52	139,700	January	June	Company Shops
Fort Worth & Denver City	1 AC	Din.-L.-Obs.	88	7	55	169,400	February	August	Budd
	1 AC	Pass.-Bag.	88	8	16	141,260	February	August	Budd
	1	Bag. & Mail	88	8	..	145,000	February	August	Budd
Illinois Central	1 AC	Bag.-D.-Coach	84	6	22	106,054	June	December	Pullman-Standard
	1 AC	Coach-Nur. Rm.	84	6	52	110,196	June	December	Pullman-Standard
	3 AC	Coach	84	6	60	107,728	June	December	Pullman-Standard
	1 AC	Diner	84	6	48	117,092	June	December	Pullman-Standard
	1 AC	Lounge-Obs.	84	6	54	107,048	June	December	Pullman-Standard
Missouri Pacific	4	Baggage	78	0	..	119,000	June	November	Company Shops
	2	Bag.-Mail	78	0	..	122,000	.....	December	Company Shops
	1 AC	Coach	84	6	48	126,800	May	Feb. '41	St. Louis Car
	1 AC	Coach-Mail	84	6	60	126,000	May	Feb. '41	St. Louis Car
New York Central	1 AC	Coach	85	0	60	108,000	April	December	Budd
Pennsylvania	1 AC	Coach	85	0	60	107,585	April	August	Budd
	5 AC	Coach	85	0	60	111,685	June	December	Budd
	1 AC	P. & B.-Dorm.	85	0	18	110,750	June	December	Budd
	1 AC	Diner	85	0	48	120,270	June	December	Budd
	2 AC	Coach	85	0	60	111,685	July	December	Budd
	4 AC	Coach	85	0	60	111,685	August	December	Budd
	1 AC	Diner-Obs.	85	0	51	110,010	June	December	Budd



Purchaser	No.	Class	Length Ft.	Length In.	Seating Capacity	Weight	Date of Order	Date of Delivery	Builder
Pullman Co.	53	Sleeping	..	..	..	.....	1940	.....	Pullman-Standard
Seaboard Air Line	3 AC	P. & B.-Dorm.	84	8	18	107,230	July	November	Budd
	7 AC	Coach	84	8	56	105,915	July	November	Budd
	3 AC	Chair-Lounge	84	8	54	105,000	July	December	Budd
	2 AC	Diner	84	8	48	115,380	July	November	Budd
Southern	18 AC	Coach	84	6	56	105,500	October	Mar. '41	Pullman-Standard
	6 AC	Coach	84	6	52	106,500	October	Mar. '41	Pullman-Standard
	5 AC	Diner	84	6	48	112,500	October	Mar. '41	Pullman-Standard
	6 AC	Pass.-Bag.	84	6	22	103,000	October	Mar. '41	Pullman-Standard
	3 AC	Obs.-L.-Tav.	84	6	55	105,000	October	Mar. '41	Pullman-Standard
	3 AC	Lounge-Tav.	84	6	55	105,000	October	Mar. '41	Pullman-Standard
	2	Bag.-Mail	84	6	..	95,000	October	Mar. '41	Pullman-Standard
	2	Bag.-Mail	84	6	..	91,500	October	Mar. '41	Pullman-Standard
	2	Bag.-Mail	84	6	..	88,500	October	Mar. '41	Pullman-Standard
Southern Pacific	2 AC†	Kitchen	59	6	..	.....	August	May '41	Pullman-Standard
	2 AC†	Diner	72	0	72	.....	August	May '41	Pullman-Standard
	2 AC†	Coffee Shop	72	0	80	.....	August	May '41	Pullman-Standard
	2 AC	Parlor-Obs.	80	0½	40	.....	August	May '41	Pullman-Standard
	9 AC	Chair	81	0	50	.....	August	May '41	Pullman-Standard
	14 AC†	Chair	68	0	50	.....	August	Mar.-Apr. '41	Pullman-Standard
	14 AC†	Chair	68	0	48	.....	August	Mar.-Apr. '41	Pullman-Standard
	2 AC†	Kitchen-Din.	72	0	..	.....	August	May-June '41	Pullman-Standard
	2 AC†	Diner	59	6	56	.....	August	May-June '41	Pullman-Standard
	2 AC†	Lounge	72	0	44	.....	August	May-June '41	Pullman-Standard
Union Pacific — Southern Pacific— Chicago & North Western	2 AC	Bag.-Dorm.	84	6	..	118,356	July	1941	Pullman-Standard
	3 AC	Chair	84	9	48	124,975	July	1941	Pullman-Standard
	2 AC	Buffet-Lounge	84	6	48	126,566	July	1941	Pullman-Standard
	2 AC	Diner	84	6	48	128,559	July	1941	Pullman-Standard
	1 AC†	Kitchen	72	0	..	118,578	July	1941	Pullman-Standard
	1 AC†	Diner	72	0	64	112,390	July	1941	Pullman-Standard
	1 AC	Club-Dorm.	84	6	30	129,958	July	1941	Pullman-Standard
	2 AC	Club	84	6	34	126,525	July	1941	Pullman-Standard

AC—Indicates cars are air-conditioned.
†—Body units of articulated or partially articulated trains.

Export

Purchaser	No.	Class	Length Ft.	Length In.	Seating Capacity	Weight	Date of Order	Date of Delivery	Builder
E. de F. Sorocabana (Brazil)	8	Coach	..	..	..	.....	October	1941-42	Electrical Exp. Corp. (Intl. G. E.-West. Intl.)
Natl. Council of Rys. (Colombia)	13	Coach	..	..	50	.....	July	1941	Amer. Car & Fdy.

Canada

Purchaser	No.	Class	Length Ft.	Length In.	Seating Capacity	Weight	Date of Order	Date of Delivery	Builder
Canadian National	5	Exp.-Mail	76	9½	..	151,780	April	August	Can. Car & Fdy.
	25	Baggage	60	10	..	118,000	April	Sept.-Dec.	National Steel
Canadian Pacific	25	Coach	83	10½	72	119,000	August	Apr. '41	Company Shops
	10	Exp.-Bag.	83	10½	..	.....	August	Mar. '41	Can. Car & Fdy.

Rail-Motor Cars

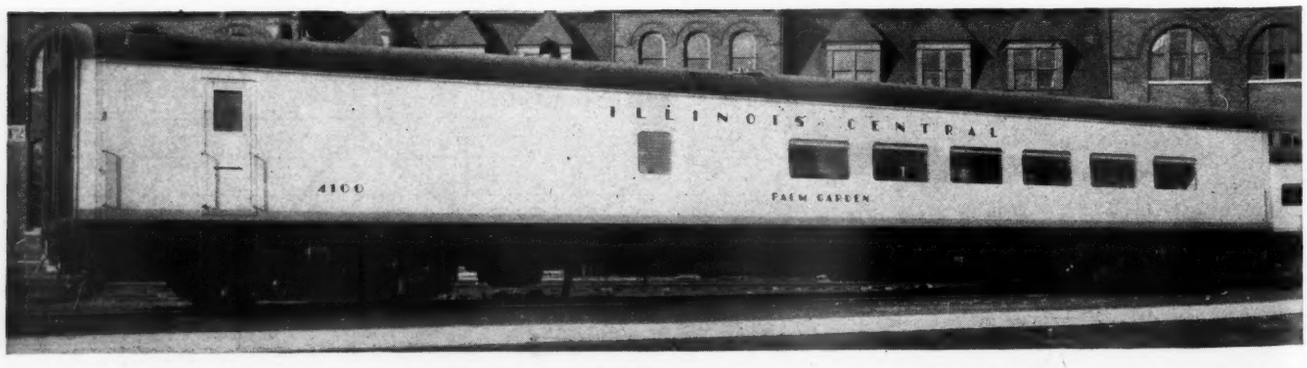
For Service in the United States

Road	No.	Type of Power Plant	Horse-Power	Seating Capacity	Length of Bagg. Compt. Ft.	Length of Bagg. Compt. In.	Weight	Builder
Illinois Central	2 AC	Oil	450	69 & 61	..	..	96,360	A.C.F.-Waukesha
	1 AC	Propane	480	73	..	..	.....	A.C.F.-Waukesha
	1 AC	Propane	240	48	..	..	.....	A.C.F.-Waukesha

AC—Indicates cars are air-conditioned.

Export

Road	No.	Type of Power Plant	Horse-Power	Seating Capacity	Length of Bagg. Compt. Ft.	Length of Bagg. Compt. In.	Weight	Builder
E. de F. Sorocabana (Brazil)	4	.....	...	..	..	..	.....	Electrical Exp. Corp. (Intl. G. E.-West. Intl.)
Natl. Council of Rys. (Colombia)	22	Oil-Hydraulic	290	44 & 40	..	..	62,000	A.C.F.-Waukesha

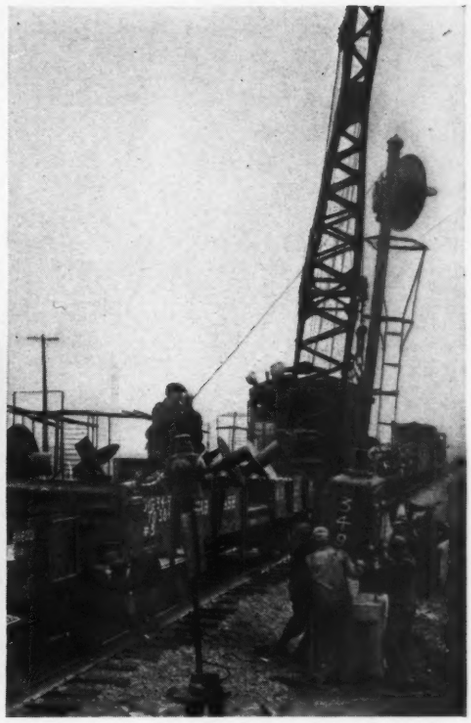


Diner for the Illinois Central's "City of Miami"—It is the Welded-Girder Type of Low-Alloy High-Tensile Steel Construction Made by the Pullman-Standard Manufacturing Company

Increased Signaling Construction in 1940

By John H. Dunn

Signaling Editor



The 1940 Signal Construction Programs Were Expedited by Using Pre-Cast Concrete Foundations, by Wiring the Cases at Central Points and Using Cranes for Field Handling

THE construction of signaling facilities in the United States and Canada during 1940 totaled 7,140 units, an increase of 2,123 units as compared with the previous year. The 1940 totals exceed those for any of the last eight years, the maximum of which was 6,599 in 1937. Several sizable projects are still under way and others are proposed, so that the prospects for 1941 are good.

Whereas in earlier years, the work done consisted primarily of signaling installed on mileage not previously so equipped, a large part of the signaling now being installed comprises the replacement of previous signaling. Likewise, several of the larger interlockings installed in 1940 involved complete replacements of interlockings which had been in service 30 to 40 years at the same locations. Some of the new interlockings, using modern types of control, replace two or more previous plants, and certain centralized traffic control projects completed last year eliminated from two to as many as four or five interlockings. Many of the 20 automatic interlockings replaced mechanical plants. In the highway crossing protection field, wig-wags are being replaced with flashing-light signals, and at many crossings where flashing-light signals were previously in service, gates are being added. Replacements of older forms of signaling with modern systems will increase in the next few years, because much of the apparatus now in service is not only worn but cannot be revised to meet the requirements of modern train operation and the needs for reductions in maintenance and operating expenses.

In addition to new projects, old equipment was replaced by modern systems to improve train operation and reduce operating expenses—Good prospects for 1941

Interlocking Construction Increased

On account of the introduction of new types of interlocking control systems, the number of levers is no longer a measure of the equipment included in a plant. The accompanying table of plants installed in 1940 is based, therefore, on the number of operative signal units and the number of interlocked switches in each plant. Furthermore, in this table, the plants using the older type of machines with mechanical locking between levers are listed separately from the plants using the more modern machines with miniature levers or buttons, the interlocking being accomplished by interconnections of circuits rather than by mechanical locking between levers. An outstanding advantage of these newer types of machines is that the controls, indications and illuminated track diagram can be concentrated on a panel, so that a man seated in a chair can reach all of the levers. Therefore, one such machine can control efficiently what would otherwise be two or more widely separated interlockings.

The rapid trend toward the adoption of these newer forms of interlocking control systems is shown by the fact that only 15 of a total of 49 manually-controlled plants installed in 1940 were of the type using mechanical locking, while 34 use miniature levers or buttons.

Of the 15 interlockings using mechanical locking that were installed in 1940, the largest was at Sheffield, Mo., on the Kansas City Terminal, including 81 operative signal units and 43 power switch machines. On the Chicago & Western Indiana, at 15th and 16th Streets in Chicago, two straight pneumatic interlockings, originally installed in 1900, were replaced with new electro-pneumatic plants, and additional signaling provided. At the passenger terminal in Atlanta, Ga., two electric interlockings that were installed originally in 1905 were replaced entirely, using new cable distributions, signals,

switch machines and new electric interlocking machines with mechanical locking.

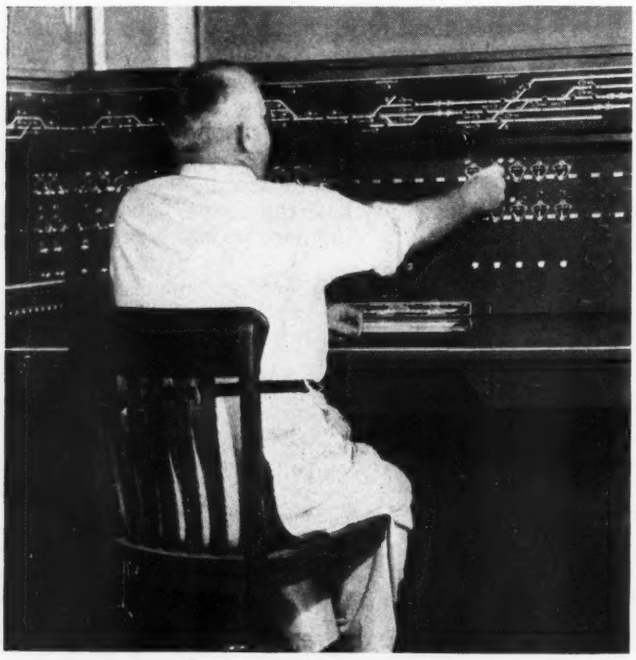
Miniature Lever and Button Plants

Turning to the more modern types of interlockings using control machines with miniature levers or push-buttons without mechanical locking, it will be seen from the tables that 34 such plants were installed in 1940. For example, at Windsor, Ont., the Michigan Central installed a button-type entrance-exit control interlocking,

Interlockings Constructed in 1940 Including Also Remotely Controlled Plants

Road	Location of Type of Control Machines	Manufacturer	No. of Signal Operating Units	No. of Switches and Derails Operated by: Electric Switch Mach.	No. of Switches and Derails Operated by: Electro Pneu. Mechanical Connections
Manual control using levers with mechanical locking					
	NEW				
A. T.	Atlanta, Ga.	G.R.S.	43	35	.. ..
		G.R.S.	47	39	.. ..
C. N.	W. End, Moncton Yard, N. B., Can.	Union	13	9	.. ..
C. & W. I.	15th St., Chicago	Union	26	..	25 ..
	16th St., Chicago	Union	28	..	21 ..
C. R. I. & P.	DesMoines, Ia.	Union	5	..	.. ..
K. C. T.	Sheffield, Mo.-Kansas City	Union	81	..	43 ..
N. Y. T. S.	34th St., New York	G.R.S.	71	20	.. ..
	W. 4th St., New York	G.R.S.	43	8	.. ..
	5th Ave., New York	G.R.S.	14	2	.. ..
T. & N. O.	Houston (Blvd. Jct.), Tex. (TL)	Union	10	2	.. 3
	Englewood, Tex.	G.R.S.	..	2	.. 2
	Houston (Tower 26), Tex.	G.R.S.	5	3	.. 5
Wabash	No. Kansas City, Mo.	Union	15	..	.. 12
W. & L. E.	Cleveland, Ohio	Union	6	..	.. 4
			407	120	89 26
	REBUILT				
A. T. & S. F.	Daggett, Cal.	G.R.S.	13	9	.. ..
B. & O.	Milford Jct., Ind.	..	11	..	.. 8
	Mt. Airy, Md.	..	5	..	.. 5
	49th St., Chicago	..	11	..	.. 18
C. & O.	Quinnimont, W. Va.	Union	..*	..	.. ..
	Guyandot (DK Cabin) W. Va.†	Union	4	1	.. ..
C. M. St. P. & P.	Medary, Wis.	Union	..	..	.. 1
	Milwaukee (Menomonee Drawbridge), Wis.	Union	1	..	.. ..
D. L. & W.	Tobyhanna, Pa.	Union	7*	..	.. 8
	Lehigh Summit, Pa.	Union	13*	..	.. 9
	Rondont, Ill.	Union	..	..	.. ..
I. T.	Wood River, Ill.	Union	16	..	.. 9
M. P.	College Station, Tex.	G.R.S.	5	..	.. 3
N. Y. C.	Buffalo, N. Y.	G.R.S. / Union	31	24	.. ..
	Gardenville Jct., N. Y.	G.R.S.	13	..	.. 3
C. C. C. & St. L.	Tates Point, Ohio	G.R.S.	12	..	.. 7
	Cold Springs, Ohio	G.R.S.	18	..	.. 11
	Indianapolis, Ind.	G.R.S.	22	20	.. ..
N. Y. T. S.	5th Ave., New York†	G.R.S.	28	2	.. ..
N. & W.	Cowan, Va.†	G.R.S.	3	1	.. ..
P. E.	Sante Fe Springs, Cal.†	Union	1	..	.. ..
Penna.	Jamesburg, N. J.	Union	13	..	.. 7
	West Newark, N. J.	Union	13	..	11 ..
	Millham Jct., N. J.	Union	18	..	18 ..
	Minnick, Md.†	Union	3	1	.. ..
	Hagerstown, Md.	Union	17	..	.. 12
	Lancaster, Pa.†	Union	16	..	5 ..
	Nisbet, Pa.	Union	4	1	.. ..
S. A. L.	1st Stono River, S. C.	Union	4	..	.. ..
	2nd Stono River, S. C.	Union	4	..	.. ..
T. R. R. A. of St. L.	St. Louis Terminal, Mo.	Union	198§	..	.. ..
W. & L. E.	Wellington, Ohio	G.R.S.	4	..	.. 1
			508	59	34 102
Manual control using miniature levers or push buttons with no mechanical locking but with circuit interlocking.					
	NEW				
Alton	Wann, Ill. (M)	G.R.S.	8	5	.. ..
B. & O.	Tottenville, N. Y. (B)	G.R.S.	7	5	.. ..
B. & M.	Portsmouth (Drawbridge) N. H. (M)	(G.R.S.) (Union)	4	2a 2b	.. ..
C. N.	St. Hyacinth, Que., Can. (M)		5	1	.. ..
C. & O.	Peach Creek, W.Va. (M)	Union	7	2	.. ..
C. M. St. P. & P.	River Jct., Minn. (M)	Union	4	1	.. ..
	Sheldon, Iowa (M)	Union	9	..	.. ..
C. R. I. & P.	Des Moines, Iowa (M)	Union	4	..	.. ..
	El Reno, Okla. (M)	Union	12	2	.. ..
D. & R. G. W.	Minturn, Colo. (M)	G.R.S.	6	2	.. ..
G. N.	Sandstone, Minn. (B)	G.R.S.	4	1	.. ..
	Sandstone, Minn. (B)	G.R.S.	4	1	.. ..
	Bedford, N. D. (B)	G.R.S.	4	1	.. ..
	Berthold, N. D. (B)	G.R.S.	6	2	.. ..
I. C.	Rialto, Tenn. (M)		4	..	.. ..
L. & N. E.	Lansford, Pa. (M)	G.R.S.	11	3	.. ..
L. & N.	Louisville, Ky. (M)	Union	7	2	.. ..
	Knoxville, Tenn. (M)	Union	9	5	.. ..
	West Point, Ky. (M)	G.R.S.	10	..	.. ..
M. S. P. S. S. M.	No. Fond du Lac, Wis., (M)	G.R.S.	4	1	.. ..
	Junction City, Wis. (M)	G.R.S.	6	1	.. ..
M. P.	Hoisington, Kan. (M)	G.R.S.	2	1	.. ..
N. Y. C.	So. Schenectady, N. Y. (B)	G.R.S.	10	3	.. ..
M. C.	Windsor, Ont., Can. (B)	G.R.S.	26	20	.. ..
	Windsor, Ont., Can. (M)	G.R.S.	14	11	.. ..
N. & W.	Hull, W. Va. (M)	Union	21	..	9 ..
	Kinney, Va. (M)	Union	10	..	3 ..
	Blake, W. Va. (M)	Union	14	..	3 ..
	Portsmouth (Star Yard), Ohio (M)	Union	4	..	1 ..
N. P.	S. P. & S. Jct., Kennewick, Wash. (M)	G.R.S.	4	1	.. ..
St. L.-S. F.	Tower Grove, Mo. (B)	Union	17	3	.. ..
	Sapulpa, Okla. (M)	Union	9	4	.. ..
S. P.	Cruzatte, Ore. (M)	Union	4	1	.. ..
T. R. R. A. of St. L.	St. Louis, Mo. (B)	G.R.S.	13	..	.. ..
			283	83	16 ..
	REBUILT				
N. Y. C. C. C. & St. L.	Louisville, Ky. (M)		14	1	.. ..
N. & W.	Stonecoal, W. Va. (M)†	Union	5	..	1 ..
Penna.	Oaks, Pa. (M)	Union	10	..	.. ..
			29	1	1 ..

TL=Table levers with mechanical locking.
†=Units added to existing installations.
*=Semaphore signals changed to light type signals.
(B)=Button, Route or NX type control.
(M)=Miniature lever control.
a=Dwarf gates.
b=Rail locks.
§=See text.



Control Machine for a Centralized Traffic Control Installation on the Pennsylvania

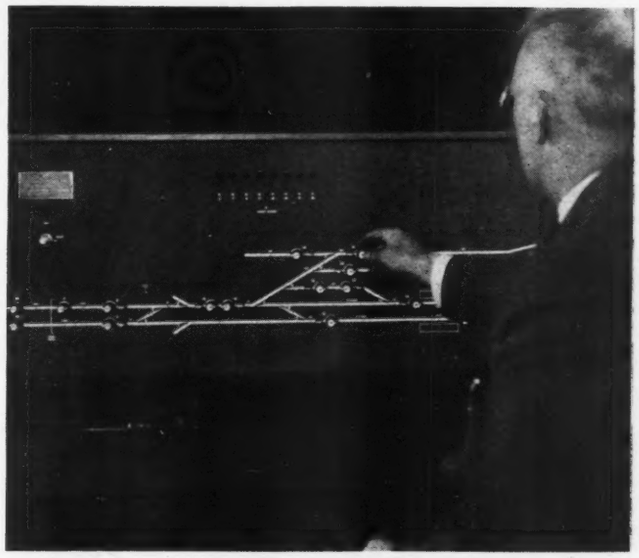
including new signals, new wiring systems, and rebuilt switch machines to replace what had previously been two separate interlockings with mechanical locking between levers. At Tower Grove in St. Louis, Mo., the St. Louis-San Francisco installed a button-type, route interlocking including 17 operative signal units and 3 switches. At Hull, W. Va., the Norfolk & Western installed a miniature lever type machine to control 21 operative signal units and 9 power switch machines in an interlocking.

During 1940, a total of 35 interlockings were extensively rebuilt, installing additional switches and signals

or in some instances new interlocking machines and new towers. A total of 537 new operative signal units, 60 electric switch machines, 35 electro-pneumatic switch machines, and 102 mechanically-operated switches were involved in these improvements. At Cold Springs, Ohio, on the Cleveland, Cincinnati, Chicago & St. Louis, a train accident destroyed the tower of a mechanical interlocking. Within 64 days, a new tower was constructed, the track layout was changed to remove the main track derails, and new signals and a new interlocking machine were installed and placed in service.

Comparison of Annual Signal Construction

Type of Installation	Number of Units 1939	1940
AUTOMATIC BLOCK SIGNALS	879	1,017
HIGHWAY CROSSING SIGNALS	2,385	3,006
INTERLOCKINGS		
Signals and switches new plants	396	1,024
Signals and switches added at rebuilt plants	545	734
Signals and switches at automatic plants	96	125
CENTRALIZED TRAFFIC CONTROL		
Signals and switches	160	496
SPRING SWITCHES		
Spring mechanisms	222	294
Mechanical facing-point locks	104	97
Signals installed at spring switches	228	336
CAR RETARDERS	2	11
	5,017	7,140



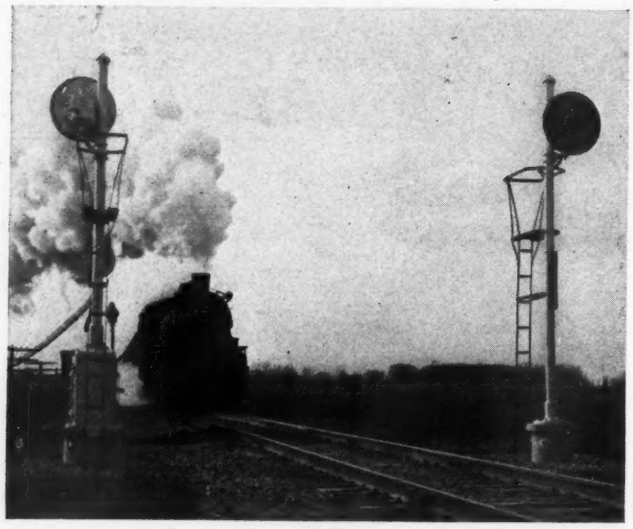
Entrance-Exit Button Control Interlocking Machine Installed on the Michigan Central

The tower and contents of a large interlocking at the Union Station in St. Louis, Mo., were destroyed by fire on July 22. This interlocking was of the electro-pneumatic type, with a machine of the lever type with mechanical locking between levers. A total of 262 working levers controlled 97 single switches, 60 double-slip switches, 5 movable-point frogs, and 296 signals. A new tower was constructed and a new interlocking machine, using levers with mechanical locking of the type previously in service, was installed and the plant was restored to service on November 30. As a part of this program, new relays and other control apparatus were installed in the tower. The track layout and the signaling arrangements were not changed, but new color-light signals were installed to replace the semaphores destroyed, and similar replacements are being extended throughout the

Automatic Block Signals Completed During 1940

Railroad	Location	Miles of Road	Number of Signals	Manufacturer
Alton	Godfrey, Ill.-Wann.	7.3 s	8 c	G.R.S.
	Wann, Ill.-Granite City	13.0 s	8 c	G.R.S.
A. T. & S. F.	Prowers,Colo.-Las Animas.	21.0 s	37 c	Union
	D. T. Jct., Ariz.-Joseph City	23.5 d	28 c	Union
B. & O.	Patterson Creek, W. Va.-McKenzie, Md.	6.3 d	4 cp	G.R.S.
B. & G.	Garfield, Utah	1.4 s	2 c	G.R.S.
	Arthur, Utah-Arthur Jct.	.5 s	1 c	G.R.S.
B. & M.	Portsmouth, N. H.	.6 d	1 c	Union
	Portsmouth, N. H.-Kittery Jct., Me.	2.9 s	4 c	Union
C. N.	West End, Moncton Yard, N.B., Can.-Gort	1.0 d	3 c	G.R.S.
	Calhouns, N.B. - Painsec Jct.	6.0 s	5 c	G.R.S.
			5 c	G.R.S.
	Moncton Yd., N.B.-Old N.T.R. Yd.	1.0 s	2 s	Union
			2 s	Union
	Old N.T.R. Yd., N.B.-Adlum Jct.	2.0 s	3 c	G.R.S.
			3 c	G.R.S.
C. & O.	Ranger, W. Va.-Peach Creek, W. Va.	31.0 d	31 c	Union
C. & I. M.	Oakford, Ill.-Athens	19.51 s	24 c	.....
C. & N. W.	Rawson, Wis.-St. Francis.	9.0 s	8 c(1)	G.R.S.
C. & W. I.	Chicago, Ill.	1.0 f	7 c	Union
C. N. S. & M.	Indian Hill, Ill.- Glencoe	3.25 d	12 c	Union
C. R. I. & P.	Des Moines, Iowa - Iowa Falls	74.0 s	96 c	Union
D. L. & W.	Pocono Summit, Pa.-Moscow	16.0 d	24 c	Union
G. T. W.	Detroit, Mich. (Forest Lawn-Gillen Yd.)	3.0 d	7 c	Union
G. N.	Sandstone, Minn.-Nickerson	27.0 s	36 c	G.R.S.
L. V.	Slatington, Pa.-Lehigh Gap	3.05 d	3 c	G.R.S.
L. & N.	Nashville, Tenn.-Mayton	4.0 d	2 s	G.R.S.
	Louisville, Ky.	2.9 d	7 s	G.R.S.
M. P.	No. Little Rock, Ark.-Amboy	1.76 d	7 c	G.R.S.
		.6 s		
N. Y. C.	Ravena, N. Y.-Weehawken, N. J. (Various Sections)	24.0 d	47 c(3)	G.R.S.
	Woodlawn, N. Y.-Botanical Garden	3.0 f	22 c(3)	G.R.S.
	Scarborough, N.Y.-Ossining	2.0 f	6 c(3)	G.R.S.
	Utica, N. Y.-Rome	10.0 f	36 c(3)	G.R.S.
	MP158.9, N. Y.-MP162 Schenectady (Various Sections)	1.0 f	4 c(3)	G.R.S.
	Tivoli, N. Y.-Germantown (Various Sections)	3.0 d	6 c(3)	G.R.S.
B. & A.	State Line, Mass.-Chatham, N. Y.	13.0 t		
		1.8 d	29 c	G.R.S.
C. C. C. & St. L.	Mitchell, Ill.-Wood River.	6.0 d	4 c	Union
N. Y. C. & St. L.	Massachusetts Ave. (Indianapolis, Ind.) Washington St.	1.0 s	1 c	Union
N. Y. T. S.	53rd St.-59th St.,New York	2.4 d	110 c	G.R.S.
		1.0 f		
N. P.	Pasco, Wash. - Ainsworth Jct.	4.06 s	10 c	G.R.S.
Penna.	Midway, Pa. - Perryville, Md.	19.8 d	8 p	Union
		1.5 s		
	Altoona, Pa.	1.5 s	2 p	Union
	Paoli, Pa.-Overbrook	14.5 f	10 p(4)	Union
	Kiskiminetas, Pa. - Conpitt Jct.	49.9 d	..†	Union
	Anoka Jct., Ind.-Bradford, Ohio	109.5 d	56 p	Union
St. L.-S. F.	Preston, Okla.-Henryetta.	19.8 s	26 s	Union
St. L. S. W.	Bossier City, La.-Shreveport	2.79 s	8 c	Union
T. & P.	Donaldsville, La.-Donaldsville Yd.	26.3 d	8 c(5)	G.R.S.
U. P.	Central City, Neb.-Alfalfa Center	72.0 d	105 c(3)	Union
	Point of Rocks, Wyo.-Rock Springs	24.0 d	32 c(3)	Union
Wabash	Brunswick, Mo.-Carrollton Jct.	25.5 s	34 c	.....
	Camden Jct., Mo.-Birmingham	23.0 s	24 c	.....
	Tolono, Ill.-Tilton	34.0 s	41 c	.....
W. M.	Brandon, Pa.-Culbertson	6.3 s	4 s	Union
W. P.	MP235.6, Cal.-MP237.7	2.1 s	4 c	Union
	Totals	306.76 s	894 c	
		435.06 d	76 p	
		13.00 t	4 cp	
		32.50 f	43 s	
	Grand Totals	787.32	1,017	

Legend:
In "Miles of Road" column: s=Single track, d=Double tracks, t=Triple tracks, f=Four tracks.
In "Number of Signals" column: s=Semaphore, c=Color-light, p=Position-light, cp=Color-position-light; (1)=Disk signals replaced with light signals, (3)=Semaphore signals replaced with light signals, (4)=Reverse signaling installed on one track, (5)=Units added to existing installation; †=Cab signals only in this territory with position-light signals only at interlockings.



New Automatic Block Signals Installed on the Wabash

plant where such signals were not in service previously. This project involved an expenditure of several hundred thousand dollars, and as an arbitrary measure of the new equipment installed, the figure 198 is entered in the statistical table to represent the new operative signal units, this being half of the total signal units on the plant.

Many more interlockings, not listed in the tables, were overhauled to remove derails, install electric track circuit locking and make other revisions in order to meet the requirements of the Interstate Commerce Commission and to remove the hazard of derail operations.

Automatic Interlockings

During 1940, a total of 20 automatic interlockings were installed, including 119 signals, 4 smashboards, 2 electric switch machines and 3 spring switches. A considerable number of these automatic plants replaced previous mechanical interlockings while the remainder were installed at crossings where no interlocking protection was in service previously. For example, the new automatic plant at Haskell, Ark., at a crossing of the Missouri Pacific and the Rock Island, replaces a mechanical interlocking. At Holdenville, Okla., where the Frisco crosses the Rock Island, no interlocking was in service previously, and the new automatic plant facilitates train operations by eliminating the train stops previously required as safety protection.

During 1940, centralized traffic control was installed on 195 miles of single track and 72 miles of double track, including 231 levers to control 121 power switches and 375 signals. These figures all represent large increases over those for 1939 when C.T.C. was installed on 62 miles of single track and 7 miles of double track, including 69 levers to control 38 power switches and 122 signals. The most extensive installation of C.T.C. completed in 1940 was on the Pennsylvania between Harmony, Ind., and Casey, Ill., involving 45 miles of single and 24 miles of double track, including 62 levers to control 41 power switch machines and 69 signals. The Missouri Pacific installed C.T.C. on 25 miles of single and 2.8 miles of double track between Benton, Ark., and Etta, using 29 levers to control 13 power switch machines and 50 signals. On the Delaware & Hudson, C.T.C. was installed on 22.5 miles of double track between Schenevus, N. Y., and Dante, using 28 levers to control 24 switches and 66 signals.

During 1940, automatic block signaling was placed in service on 307 miles of single-track, 435 miles of double-track, 13 miles of three-track and 33 miles of four-track lines, totaling 1,340 miles of track, an increase of 616 miles over that for the previous year. A total of 1,017 automatic signals were installed in 1940, as compared with 879 in 1939. This proportionate reduction in the number of signals is due in part to the fact that signals are now being spaced farther apart in order to provide adequate train-stopping distances.

Automatic Interlockings Installed During 1940

Road	Location	Manufacturer	No. of Signals	No. of Switches
C. N.	Ste. Rosalie, Que., Can.	..	11	..
	Ha Ha Bay, Jct., Que., Can.	..	6	..
C. M. St. P. & P.	Norwood, Minn.	Union	4(4)	..
	Perry, Iowa	Union	8	..
	Stiles Jct., Wis.	Union	2	..
	Forest Jct., Wis.	Union	2	..
C. R. I. & P.	West DesMoines, Iowa	Union	6	..
D. M. & I. R.	Spart Jct., Minn.	G.R.S.	4	..
	Hull Jct., Minn.	G.R.S.	4	..
G. N.	Lester, Iowa	G.R.S.	12	..
I. C.	Charles City, Iowa	..	4	..
	Bemis, Tenn.	..	8	..
K. C. S.	Edar Grove, near Shreveport, La.	G.R.S.	9	..
L. & N.	Mobile, Ala.	G.R.S.	8	2
M. S. P. S.	Black Creek, Wis.	G.R.S.	4	..
M. P.	Haskell, Ark.	G.R.S.	7	..
St. L.-S. F.	Holdenville, Okla.	Union	8	..
St. L. S. W.	Bossier City, La.	Union	4	..
T. & N. O.	Iowa Jct., La.	Union	6	..
W. & L. E.	Harmon, Ohio	Union	6	..
			123	2

Legend:
(4) Smashboards.

Centralized Traffic Control Installations Completed in 1940

Railroad	Location	Miles of road	Manufacturer	Direct Wire or Coded Control	No. of Levers: Desk Type	No. of Levers: C.T.C. Type	No. of Levers: Power Oper. Swths.	No. of Signals Controlled
C. R. I. & P.	Briark, Ark.-Hulbert	5.6 s	Union	DW	...	2	...	8
D. & H.	Schenevus, N.Y.-Dante Central Bridge, N. Y. Delanson	22.5 d	G.R.S.	C	...	28	24	66
Erie	N.J. & N.Y. Jct. (Rutherford N.J.-Hackensack River Drawbridge	2.0 s	G.R.S.	DW	..*	...	1	5
G. M. & O.	M.P.384.70, Tenn.-M.P. 381.81	2.9 s	G.R.S.	DW	...	...	2	3
M. P.	Osage, Mo. - Jefferson City	1.7 s 11.0 d	G.R.S.	C	...	15	12	33
	Benton, Ark.-Etta	24.8 s 2.8 d	G.R.S.	C	...	29	13	50
N. Y. O. & W.	Fallsburgh Tunnel, N. Y.-Fallsburgh	.5 s	Union	DW	1	...	2	2
N. & W.	Kelsa, Va.-Devon, W. Va.†	8.3 s	Union	C	...	5	1	8
Penna.	Creswell, Pa.-Minnick, Md.	31.7 s 5.1 d	Union	C	...	25	9	28
	Jamison Rd., N. Y.-Machias	22.0 s 6.4 d	Union	C	...	20	5	15
	Hudson, O. - Arlington (Akron)	11.6 s	Union	C	...	17	4	15
	Harmony, Ind. - Casey, Ill.	45.0 s 23.9 d	Union	C	...	62	41	69
P. M.	Porter, Ind. - New Buffalo, Mich.	20.0 s	.....	DW	4	...	...	22
	Seymour, Mich. - Elmdale	16.0 s	G.R.S.	C	...	7	1	12
T. & P.	Marshall Yd., Tex.-Marshall (Yard)	1.1 s	G.R.S.	C	...	3	2	13
	Alexandria, La.-Alexandria (Yard)	1.7 s	G.R.S.	DW	...	7	...	14
	Donaldsville, La. - Donaldsville (Yard)	.5 d	G.R.S.	DW	...	6	4	12
		194.9 s 72.2 d			5	226	121	375
		267.1						

Legend:
In "Miles of Road" column: s=Single track, d=Double track.
C=Coded Control.
DW=Direct Wire Control.
† Units added to existing installations.
* 6 levers in interlocking machine.

Another factor is that the Pennsylvania installation on 50 miles of double track between Kiskiminetas, Pa., and Conpitt Jct., includes no wayside automatic signals, the aspects being displayed by signals in the cabs of the locomotives.

During 1940, rapid progress was made in the adoption of the newly developed coded track circuit system of control, by means of which the wayside signals, and also cab signals if used, can be controlled to display as many aspects as desired, by codes on the rails, thus eliminating wayside line control circuits. This coded track circuit system was used in the Pennsylvania installation mentioned above and also in the Anoka Junction, Ind.,-to-Bradford project, as well as in several installations on the Norfolk & Western. Other extensive automatic signaling projects using the coded track circuit system are now being constructed on the St. Louis Southwestern and the Denver & Salt Lake.

Locomotive Train Control Equipment Installed in 1940

Road	Locomotives Equipped Steam	Diesel Electric	Manufacturer
A. C. L.	...	14	U. S. & S.
A. T. & S. F.	...	3	U. S. & S.
B. & O.	...	4	G. R. S.
B. & M.	5	...	U. S. & S.
F. E. C.	...	15	U. S. & S.
	...	1	G. R. S.
I. C.	...	1	U. S. & S.
N. Y. C.	50	...	G. R. S.
Southern	...	7	G. R. S.
U. P.	...	8	U. S. & S.

A New-High of 321 Automatic Gates with Flashing-Light Signals Were Installed

In addition to the automatic block signaling installed in 1940 on lines not previously so equipped, many roads completed programs of signal replacements. For example, on the Norfolk & Western, semaphore signaling was replaced in entirety by a new system of position-light signaling, using coded track circuit control. On 9 miles of single track, the Chicago & North Western replaced disk type signals with color-light signals. In order to provide proper spacings in accordance with the increased braking distance of high-speed trains, many roads have rehabilitated automatic signaling by removing certain signals and respacing the remainder. As a part of these programs, semaphores are in some instances replaced by light signals. Such a program was completed

A Total of 2,199 Flashing-Light Crossing Signals Were Installed in 1940

Spring Switches Installed During 1940

Railroad	Total No. of Spring Switches Installed	Classification as to Application: End of Passing Track	End of Double Track	Junction	Yard Track	Total No. Equipped with Facing Point Lock	Signal Protection: High Signals	Low Signals
A. T. & S. F.	38	38	..	..	..	..	..	24
A. C. L.	8	8	..	..	..	8	..	..
B. & O.	2	1	1	..	..	1	3	1
B. & M.	1	1	..	..	..	..	..	..
C. N.	14	9	5	..	..	..	10	1
C. P.	2	..	..	2	..	2	4	..
C. of G.	1	1	..	..	..	1	..	..
C. V.	1	..	..	1	..	..	1	..
C. & O.	10	10	..	..	..	10	20	10
C. & I. M.	3	3	..	..	..	..	..	3
C. M. St. P. & P.	6	5	..	1	..	5	11	5
C. R. I. & P.	8	4	1	3	..	7	10	2
C. S. S. & S. B.	4	4	..	..	..	..	4	..
D. L. & W.	1	1	..	..	..	..	..	..
D. & R. G. W.	6	4	..	..	2	3	..	3
Erie	4	1	2	1	..	4	4	1
G. N.	3	2	..	..	1	3	4	..
I. C.	9	5	3	..	1	..	12	7
K. C. S.	1	..	1	..	..	..	2	1
L. & N. E.	1	..	..	..	1	..	..	..
L. & N.	33	33	..	..	..	..	64	6
M. St. P. & S. S. M.	4	4	..	..	..	4	4	4
D. S. S. & A.	3	..	..	..	3	..	2	..
M. P.	3	1	2	..	..	3	5	1
M. P. in Neb.	2	1	..	..	1	2	..	..
N. Y. C. & St. L.	5	4	1	..	..	4	..	..
N. Y. N. H. & H.	2	2	..	..	..	2	4	2
N. & W.	8	5	..	1	2	1	7	6
N. S.	1	1	..	..	..	..	..	..
P. E.	1	1*	..	..	..	..	1	..
P. M.	8	5	2	..	1	7	1	5
Penna.	4	2	1	1	..	4	2	1
St. L. S. W.	2	1	1	..	..	2	2	..
S. A. L.	4	3	..	..	1	3	..	1
Southern	39	39	..	..	..	..	..	1
C. N. O. & T. P.	1	1	..	..	..	..	..	..
A. G. S.	5	5	..	..	..	..	..	1
N. O. & N. E.	7	7	..	..	..	..	..	..
G. S. & F.	6	6	..	..	..	..	..	..
S. P.	18	14	2	2	..	17	33	8
	..	..	2	..	1	2	6	1
T. & N. O.	5	2	..	1	2	..	9	6
T. & P.	3	..	..	..	3	..	3	3
Virginian	2	2	..	..	..	..	2	..
W. M.	2	..	2	..	..	2	2	..
Totals	291	236	26	13	19	97	232	104

Legend:
* One end of crossover.

in 1940 on the Union Pacific on 24 miles of double track between Point of Rocks, Wyo., and Rock Springs, and on 72 miles between Central City, Neb., and Alfalfa Center. On many miles of territory not listed in the table, previously existing automatic signals have been rearranged, work of this nature having been done in 1940 on the Boston & Maine on short mileages between East Everett, Mass., and Chelsea, and between Westville,

Highway-Railroad Grade Crossing Protection Installed During 1940

Railroad	No. of Crossings	Source of funds: Railroad	Federal	State	City-County Private†	Total Protection Units	No. of Wig-Wag Signals	No. of Flashing-Light Signals	No. of Rotating Disk Stop Sign Signals With Flashing Lights	No. of Traffic Type Stop-and-Go Crossing Signals	Gates
Alton	4	1.50	2	.50	..	10	..	10	..	..	..
A. T. & S. F.	66	17.50	47	..	1.50	150	15	131	..	..	4
A. B. & C.	13	..	13	..	..	32	..	32	..	..	..
A. & St. A. B.	1	..	.50	.50	..	2	..	2	..	..	..
A. C. L.	29	..	29	..	..	71	..	43	28	..	..
B. & O.	19	11.50	4	1.50	2	43	..	39	..	..	4
B. & L. E.	1	..	..	..	1	8	..	6	..	..	2
B. & M.	11	1	9	..	1	45	..	37	..	..	8
Spring. Term.	2	..	2	..	..	6	..	6	..	..	..
C. P.	10	3.20	3.80	2.30	.70	22	12	6	..	..	4
C. of Ga.	4	..	4	..	..	11	..	11	..	..	..
C. V.	9	..	9	..	..	20	..	20	..	..	..
C. & O.	28	21	7	..	..	82	8	74	..	..	..
C. & E. I.	22	13	6	3	..	48	..	48	..	..	..
C. & I. M.	2	2	..	..	..	6	..	4	..	..	2
C. & N. W.	36	2	34	..	..	82	2	36	40	..	4
C. & W. I.	1	1	..	..	..	8	..	4	..	..	4
C. B. & Q.	32	..	31	..	1†	78	..	58	6	..	14
C. G. W.	23	1.50	21	..	.50	46	..	8	28	..	10
C. I. & L.	9	1	8	..	..	18	..	17	..	..	1
C. M. St. P. & P.	105	11	92	1	1	267	8	96	133	..	30
C. R. I. & P.	90	18	72	..	..	182	..	71	46	..	65
C. St. P. M. & O.	6	..	6	..	..	21	..	9	12	..	..
C. S. S. & S. B.	5	3	2	..	..	11	..	5	..	..	6
C. & S.	10	..	10	..	..	22	..	20	..	..	2
D. & H.	5	5	..	..	..	11	..	11	..	..	..
D. & R. G. W.	29	..	29	..	..	62	..	62	..	..	..
D. T. & I.	2	1	1	..	..	4	..	4	..	..	..
E. J. & E.	2	..	2	..	..	10	..	6	..	..	4
Erie	7	6	1	..	..	20	..	13	..	1	6
F. E. C.	4	1	3	..	..	8	..	8	..	..	..
G. N.	20	2	18	..	..	40	..	..	40	..	..
I. C.	26	10	15.50	..	.50	62	..	58	..	..	4
I. T.	7	1.34	2.83	2.83	..	17	..	17	..	..	..
I. U.	1	..	1	..	..	2	..	2	..	..	..
K. C. S.	3	2	1	..	..	8	..	6	..	..	2
L. & H. R.	1	1	..	..	..	2	..	2	..	..	..
L. & N. E.	4	2.50	..	1.50	..	8	..	8	..	..	..
L. V.	3	2.50	..	.50	..	6	..	6	..	..	..
L. & A.	1	..	.50	.50	..	2	..	2	..	..	..
L. & N.	14	3	11	..	..	36	..	25	..	..	11
Me. C.	6	..	5	1	..	16	..	14	..	..	2
M. & St. L.	18	..	18	..	..	18	..	18	..	..	..
M. & A.	1	..	1	..	..	4	..	2	..	..	2‡
M.-K.-T.	16	1	15	..	..	39	..	35	..	..	4
M. P.	22	10	12	..	..	49	..	47	..	..	2
M. P. in Neb.	2	2	..	..	..	4	..	4	..	..	..
M.-I.	1	..	1	..	..	2	..	2	..	..	..
G. C. L. & I. G. N.	7	1	..	6	..	15	..	15	..	..	..
Monong.	2	2	..	..	..	4	..	4	..	..	..
N. C. & St. L.	10	..	10	..	..	21	..	21	..	..	..
N. Y. C.	41	29	11	1	..	105	1	96	..	..	8
B. & A.	1	1	..	..	..	2	..	2	..	..	..
C. C. C. & St. L.	26	8	18	..	..	57	..	55	..	..	2
P. & E.	4	.34	3	.33	.33	8	..	8	..	..	..
M. C.	53	28	21	..	4	187	..	168	..	5	10 4‡
P. & L. E.	2	1	1	..	..	4	..	4	..	..	..
I. H. B.	2	..	2	..	..	8	..	4	..	..	4
N. Y. C. & St. L.	10	3	7	..	..	20	..	20	..	..	..
N. Y. N. H. & H.	1	1	..	..	..	2	..	2	..	..	..
N. & W.	9	6	..	3	..	18	12	6	..	..	..
N. S.	1	..	1	..	..	2	..	2	..	..	..
N. P.	26	5	21	..	..	52	..	45	7	..	..
Oahu	2	..	2	..	..	6	..	4	..	..	2
P. E.	5	1.50	1	..	2.50	9	4	2	..	3	..
Penna.	54	18.50	33	1.50	1†	126	..	122	..	..	4
Penna. Read. S. S.	4	3	1	..	..	4	..	4	..	..	..
P. M.	14	3.90	7	2.10	1	35	6	29	..	..	..
R. C. B. H. & W.	1	..	..	1	..	4	..	2	2	..	..
Reading	1	..	..	..	1	2	..	2	..	..	..
St. L.-S. F.	10	7	..	3	..	16	6	10	..	..	..
St. L. S. W.	4	1	3	..	..	9	..	9	..	..	..
S. A. L.	23	..	23	..	..	48	..	48	..	..	..
Southern	21	1	20	..	..	46	..	44	..	2	..
C. N. O. & T. P.	1	..	1	..	..	2	..	2	..	..	..
A. G. S.	2	..	2	..	..	4	..	4	..	..	..
S. P.	17	3.32	9	1	2.68 1†	37	5	32	..	..	..
T. & N. O.	10	8	2	..	..	17	5	6	..	2	4
T. & P.	1	..	1	..	..	3	..	3	..	..	..
U. P.	58	..	58	..	..	141	18	113	..	..	10
Wabash	19	7.50	..	7	4.50	49	..	33	..	..	16
W. M.	2	1	..	1	..	4	..	4	..	..	..
W. P.	16	1	14	1	..	30	2	28	..	..	..
W. & L. E.	20	5	15	..	..	49	..	45	..	..	4
C. N.	15	8.49	5.73	.30	.48	27	21	..	..	..	6
G. T. W.	29	9	13	..	7	112	..	56	..	..	56
Totals	1257	323.09	855.86	43.36	31.69 3†	3006	125	2199	342	13	321 6‡

† = Installation paid for by industries or individuals.
‡ = Barriers of the type which rise up out of the surface of the pavement.

N. H., and Newton Jct., as well as on the Canadian National between Calhouns, N. B., and Poinsec Jct., and between Moncton Yard, N. B., and Old Yard. A program now proposed on the Chicago, Indianapolis & Louisville, and approved by the Interstate Commerce Commission, involves the removal of certain signals and the respacing of others on 382 miles of single track.

Highway-Railroad Grade Crossing Protection Installed During 1940

State or Province	Crossings No. of	Source of funds: Railroad	Federal	State	City-County Private†	Total Protection Units
Ala.	6	..	6	..	..	13
Ariz.	2	..	2	..	..	5
Ark.	16	1	14	1	..	40
Cal.	37	9.07	18	2	6.93 1†	72
Colo.	14	1	13	..	..	31
Conn.	7	..	7	..	..	16
Del.	15	..	15	..	..	36
Fla.	6	1	5	..	..	12
Ga.	27	..	27	..	..	63
Idaho	35	..	35	..	..	95
Ill.	135	57.18	55.33	11.16	11.33	351
Ind.	95	23	70	1	1	235
Iowa	168	3	165	..	..	384
Kan.	26	7	19	..	..	61
Ky.	28	11	17	..	..	67
La.	13	3	10	..	..	26
Maine	6	..	5	1	..	16
Md.	1	..	1	..	..	2
Mass.	2	1	..	..	1	8
Mich.	86	34.50	44	1	6.50	275
Minn.	17	..	17	..	..	42
Mo.	18	15.50	1	.50	1	31
Mont.	7	3	4	..	..	14
Neb.	35	2	33	..	..	76
Nev.	11	..	11	..	..	24
N. H.	1	..	1	..	..	7
N. J.	6	5	1	..	..	10
N. M.	6	..	6	..	..	12
N. Y.	39	31	8	..	..	95
N. C.	31	1	27	3	..	74
N. D.	25	..	25	..	..	44
Ohio	63	43	18	1	1	155
Okla.	33	..	31	2	..	76
Ore.	1	1	..	..	..	2
Penna.	22	10.50	2	6.50	2 1†	52
S. C.	23	1	22	..	..	51
S. D.	12	..	11	1	..	28
Tenn.	10	..	10	..	..	21
Tex.	33	17	10	6	..	65
Utah	42	..	42	..	..	90
Vt.	5	..	5	..	..	14
Va.	12	4	8	..	..	25
Wash.	14	3	11	..	..	35
W. Va.	15	13	2	..	..	48
Wis.	21	6	14	..	1†	49
Hawaii	2	..	2	..	..	6
N. B.	2	.45	1.10	.30	.15	3
N. S.	6	3.80	1.60	.60	..	10
Ont.	11	4.70	3.20	2.90	.20	22
Que.	8	3.10	3.20	1.20	.50	15
Sask.	1	.34	.33	..	.33	2

† Installation paid for by industries or individuals.

The estimated cost of the changes is $16,300 and the annual savings to be effected are estimated at $9,000. As a part of respacing programs, several roads are replacing oil semaphore lamps with electric lamps controlled by approach circuits, such changes having been made last year by the C. & N. W. on 50 miles of single track between Clyman, Wis., and Buffalo, and on 54 miles of double track between Evansville, Wis., and Merriam.

Spring Switches Increased

Oil-buffer-type spring mechanisms for the operation of switches were installed at 291 switches during 1940, as compared with 222 in the year previous. Of the spring switches installed in 1940, 236 were at the ends of passing tracks, 26 at the ends of double track, 13 at junctions and 19 on yard tracks. Mechanical facing-point locks, which give protection equivalent to interlocking for main line train movements, were installed at 97 spring switches during 1940, as compared with 104 the previous year. As part of the spring switch projects completed in 1940, a total of 336 signals, including 232 high signals and 104 dwarfs, were installed, as compared with 228 signals in 1939.

Highway Crossing Protection Increased

Automatically-controlled, highway-railroad crossing protection was installed at 1,257 crossings, using 3,006 units of protection equipment in 1940, as compared with 1,019 crossings and 2,385 units in the year previous. A unit includes a complete flashing-light signal, with back-to-back mounting, a wig-wag, or a gate. The increasing preference for flashing-light signals as compared with wig-wags is shown by the fact that 2,199 flashing-light signals were installed, as compared with only 125 wig-wags. Of the wig-wags installed, 42 were in Canada, 28 in California and 12 in Utah. The vast majority of the flashing-light signals installed in 1940 were equipped with button-type reflector signs reading, "Stop on Red Signal." Signals including a rotating disc sign reading "STOP," together with flashing lights, are preferred in some states, a total of 342 such signals being installed in 1940; 183 in Iowa, 39 in Minnesota, 32 in Wisconsin and 25 in South Dakota.

The widespread adoption of automatically-controlled gates as an effective means of crossing protection is indicated by the installation of 321 gates in 1940, as compared with 291 in the year previous. On the vast majority of these projects, short-arm gates, which obstruct only the traffic lane approaching the tracks, are used in conjunction with standard flashing-light signals. Barriers of the type which rise up out of the surface of the highway were installed at 2 crossings on the Michigan Central and on one crossing on the Missouri & Arkansas.

As shown in the table classifying the crossing protection between the states, protection was installed during 1940 at 168 crossings in Iowa, 135 in Illinois, 95 in Indiana and 86 in Michigan. Of the total of 1,257 crossings at which protection was installed during the last year, the railroads paid for 323 projects, the federal government for 856, the states or provinces for 43, counties and cities for 32, and private interests for 3.

Only one installation of car retarders was placed in service during 1940, this project being in a gravity type freight classification yard on the Louisville & Nashville at DeCoursey, Ky., which included 20 classification tracks, 19 power switches, and 11 retarders, totaling 847 rail feet of retarders.

Car Retarders Installed During 1940

R. R.	Location	No. of Class Tracks	No. of Towers	No. of Retarders	Tr. Feet Retarders	Rail Feet Retarders	No. of Power Switches	Manufacturer
L. & N.	DeCoursey, Ky.	20	1	11	423½	847	19	G.R.S.

The principal activities in the automatic train control field during 1940 consisted of the installation of equipment for locomotives, especially for new light-weight trains operated on through routes including sections of various roads, a total of 103 new sets of locomotive equipment being furnished, of which 55 were for steam locomotives and 53 for Diesel-electric locomotives.

Communication Facilities Increased During 1940

New apparatus utilizes existing line wires to provide more printer telegraph and long-distance telephone capacity to expedite service to customers as well as railroad business as a whole

By John H. Dunn

Associate Editor

A Total of 166 Telegraph Printing Machines Were Installed in 1940

DURING 1940, the railroads made rapid strides not only in modernizing telegraph and telephone facilities, but also in providing additional communication service designed to reduce delays to trains, facilitate regular telegraph message traffic, by the use of printers, and provide more long-distance telephone communication, as aids in rendering better service to passengers and shippers as well as expediting all classes of railroad business.

Serve the Public Quickly

The public is now expecting prompt information concerning tickets, reservations and the supply of cars for loading as well as the location of cars in transit. The demand for this service is increasing with reference to troops and commodities of various classes involved in the National Defense program. For example, on one road, messages or telephone calls concerning service to customers take precedence over communications on other matters, even between general officers. This increased communication load to serve the public has developed during a period when the entire tempo of railroad operation has been stepped up to such a degree that important matters between various officers and employees must be settled promptly by wire communication rather than by mail, thereby increasing the communication load still further. The crying demand on many roads, therefore, is for increased capacity of expedient long-distance telegraph message and telephone service. The answer is the provision of printer telegraph and long-distance telephone circuits, as evidenced in the accompanying tables showing the construction of communication facilities on the railroads during 1940.

The railroads are rapidly replacing Morse code telegraph with printing telegraph for the transmission of messages including train consists, etc., between important offices, terminals and yards. For example, in 1940, printer circuits were installed on 15,108 miles of road, including the use of 163 new machines for sending and receiving, as compared with 6,919 miles of circuits and 92 machines in 1939. The Burlington led in these activities by installing 2,985 miles of printer circuits, using 57 machines. On large systems, the printer circuits are so connected through interconnecting switching centers that a printer in one city can be operated directly through to another a thousand miles or more distant, thus eliminating re-

Principal Increases in Communication Plant Facilities in the United States and Canada During 1940, as Compared with 1939

	1940	1939
Miles of new or rebuilt pole line:		
Railroad owned	2,440	2,762
Commercially owned	3,319	5,376
Jointly owned	1,713	1,567
Total	7,472	9,705
Miles of new copper wire:		
Railroad owned	4,233	3,170
Commercially owned	1,832	2,652
Total	6,065	5,822
Gross increase in miles of road dispatched by telephone	519	871
Increase in miles of long distance telephone circuits	8,797	8,410
New mileage of telegraph circuits, all types	3,965	11,705
Increase in miles of printing telegraph circuits	15,108	6,919
Number of new printing telegraph machines	163	92
Increase in miles of new carrier-current systems	9,824	9,825

sending. The net result is that messages are now being sent and received over long distances in periods of a few minutes, rather than hours.

Train consists are transmitted by page printers while the trains are enroute, so that switching lists can be prepared and classification can be started as soon as a train arrives at a yard or terminal. For cars destined for through connections, this procedure saves 20 min. or more. To save this much time on a 100-mile run, the

average speed of a train would have to be increased from 50 m. p. h. to 60 m. p. h. for the entire distance.

As an aid in expediting railroad business as a whole, many carriers are providing long-distance telephone service for use in those numerous instances in which conversation between two individuals will bring out all the phases of the problem at hand and permit a decision to be made at once. In 1940, for example, 13 roads installed long-distance telephone service on a total of 8,797 miles, as compared with 8,410 miles in 1939.

Additional Service on Existing Wires

With division headquarters spaced 100 miles or more apart, and with general offices frequently at one end of a system rather than at a central point, pole lines and line wires represent the major portion of expenditures for railroad communication facilities. In order to meet the demands for additional printer telegraph message and long-distance telephone service economically, communication engineers have been forced to devise schemes for transmitting two or more messages simultaneously over one line circuit. As a result, a telephone circuit can be superimposed on two wires used also for separate telegraph circuits, as was done on 130 miles of the Illinois Central in 1940. By interconnection of circuits, known as simplexing and duplexing, two and in some cases three or four separate channels can be secured. In this way, the Rock Island obtained 119 miles of telephone circuit by simplexing with a telegraph circuit, while the Denver & Rio Grande Western obtained 330 miles of printer telegraph circuit by simplexing with a telephone circuit. The Erie obtained 93 miles of printer circuit by duplexing an existing printer circuit. The New Haven obtained 140 miles of printer circuit by simplexing on existing telephone wires and the Pennsylvania did the same to secure 203 miles of printer circuit. The St. Louis Southwestern derived 200 miles of additional telegraph circuits by simplexing on existing wires and the Southern accomplished the same result on 152 miles. The Union Pacific obtained 334 miles of printer telegraph circuits by simplexing on existing telephone circuits, while the Western Pacific secured 930 miles of printer circuit by simplexing.

Having reached the limit of capacity which can be secured by simplexing, duplexing, etc., many roads are now adopting a more modern practice of using carrier current systems to handle numerous additional circuits on existing line wires. In a carrier system, various bands of radio frequencies are superimposed on existing line wires, which are used also in the ordinary manner for physical telephone and telegraph circuits. For example, with one type of the carrier system, one existing line wire circuit can handle 12 telephone conversations simultaneously, or one line circuit can handle 1 physical telephone channel and 10 telegraph channels. Three conductors in a special type coaxial cable, installed in 1940 between Stevens Point, Wis., and Minneapolis, Minn., is to handle more than 240 different telephone conversations simultaneously.

Principal Printing Telegraph Installations Completed in the United States and Canada During 1940

	Miles of Circuit	Number of Machines
Atchison, Topeka & Santa Fe	541	10
Canadian National	1,184	6
Canadian Pacific	1,766	14
Chicago, Burlington & Quincy	2,985	57
Chicago, Milwaukee, St. Paul & Pacific	2,188	3
Chicago, Rock Island & Pacific	937	9
Denver & Rio Grande Western	330	3
Erie	1,162	18
Lehigh Valley	320	8
Missouri Pacific	1,578	19
New York, New Haven & Hartford	140	4
Pennsylvania	712	5
Union Pacific	335	5
Western Pacific	930	2
	15,108	163

New Mileage of Telephone Train Dispatching and Long-Distance Telephone Circuits Placed In Service During 1940

	New Miles of Road Dispatched by Telephone	Miles of New Long-Distance Telephone Circuits
Atchison, Topeka & Santa Fe	213	98
Canadian National	13	278
Canadian Pacific	...	288
Central of Georgia	53	191
Chesapeake & Ohio	...	255
Chicago, Burlington & Quincy	...	3,765
Chicago, Rock Island & Pacific	...	525
Denver & Rio Grande Western	...	332
Erie	...	18
Gulf, Mobile & Ohio	2	...
Great Northern	11	...
Illinois Central	12	130
Missouri Pacific	...	168
New York Central		
Cleveland, Cincinnati, Chicago & St. Louis	...	20
Pacific Electric	...	15
Pennsylvania	...	53
St. Louis-San Francisco	...	124
St. Louis Southwestern	165	...
San Diego & Arizona Eastern	...	148
Seaboard Air Line	...	320
Southern	50	152
Southern Pacific	...	1,490
Texas & New Orleans	...	86
Texas & Pacific	...	194
Wabash	...	147
	519	8,797

Carrier Installed in 1940

Sixteen roads installed the carrier system during 1940. The Chicago, Burlington & Quincy derived 3,565 miles of long-distance telephone circuits and 410 miles of telegraph printer circuits by the application of carrier. On a 278-mile installation, the Canadian Pacific secured 129 miles of telephone and 1,520 miles of telegraph printer circuits, and the Canadian National secured 761 miles of telegraph printer circuits. The Chesapeake & Ohio used carrier for 255 miles of telephone circuits, and the Central of Georgia installed carrier for the same purpose on

(*Continued on page 119*)

Principal New and Rebuilt Pole Line Construction and New Line Wire Installed in the United States and Canada During 1940

	New or Rebuilt Pole Lines			Miles of New Copper Wire	
	Miles of Railroad Owned	Commercially Owned	Jointly Owned	Railroad Owned	Commercially Owned
A. T. & S. F.	...	...	249	708	50
A. C. L.	...	99	...	...	153
C. N.	...	...	772	514	544
C. P.	...	...	...	...	454
C. & O.	223	12	...	87	...
C. B. & Q.	245	...	26	184	...
C. M. St. P. & P.	...	...	...	202	...
C. R. I. & P.	14	125	83	...	...
C. St. P. M. & O.	...	169	...	...	15
D. & R. G. W.	...	...	...	591	...
Erie	0.2	117	...	...	...
I. C.	149	...	...	78	60
L. & N.	893	...	...	...	...
M. St. P. & S. S. M.	136	...	113	12	...
M. P.	...	83	...	168	...
N. C. & St. L.	261	...	...	...	...
N. Y. C. & St. L.	...	136	...	...	...
N. Y. N. H. & H.	...	137	...	176	9
Penna.	238	...	...	53	...
St. L.-S. F.	...	541	...	64	44
St. L. S. W.	...	303	...	464	...
S. A. L.	...	50	...	...	320
S. P.	...	647	...	...	21
T. & N. O.	...	124	...	116	51
U. P.	...	139	195	0.41	...
Wabash	...	149	...	135	...

Modern Highway Units Broaden the Flexibility of Railway Service

Co-Ordinated Service Continues Progress

Rail-highway operations were expanded during the year, with new roads entering the field

By Charles Layng

Transportation and Motor Transport Editor

WITH the establishment of universal pick-up and delivery service several years ago, all of the railways in the country were projected into the motor trucking business, whether they desired or not. At that time, many of them did not like it and were strongly of the opinion that the railways should stay in the "railway business" in the narrowest definition of that term. Since that time the picture has changed materially. Even those railways who were then operating highway subsidiaries have increased their fleets of buses and trucks and many more railways have established such subsidiaries. Most railway executives now share the point of view that "railway business" consists not merely in the running of trains on tracks, but the provision of a complete transportation service in the form the shipper desires. The year 1940 was marked by many efforts along these lines, in which existing bus and truck fleets were expanded and new rail-highway subsidiaries were formed.

The last year reflected the growing acceptance of this attitude in the number of new co-ordinated services offered, many of them in conjunction with new high-speed freight schedules. The operation of fast trains between two large terminals is no longer enough to attract business. Shippers in the smaller cities are demanding equal service and they have the option of using competing forms of transportation if the railways do not give them what they consider adequate service. It is, of course, impossible to stop high-speed trains every few miles, but, with co-ordinated truck service from designated distribution points, schedules can be provided for the smaller cities and towns equivalent to those offered the larger centers.

Unfortunately, the Interstate Commerce Commission does not see eye to eye with the railways on this as yet, In June, a hearing was held before the Commission with railways, chambers of commerce and shippers requesting that certain hampering restrictions covering railway truck operations be removed, but the Commission has continued to adhere to these restrictions. In addition,

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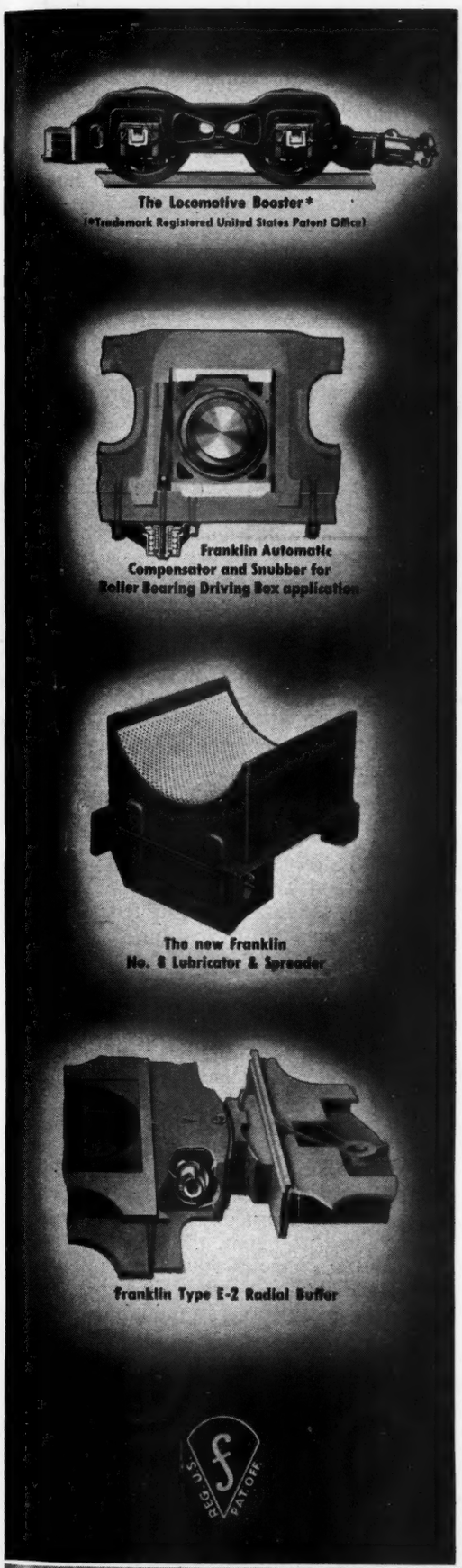

AGAIN IN 1940

Every Steam Locomotive Built For Domestic Use Was Equipped With Franklin Devices

In 1940, as in other years, every steam locomotive built in the United States for domestic use was equipped with Franklin Devices. This is the usual example of their wide acceptance because . . . THEY MAKE FOR ECONOMY.

Those illustrated are foremost because they improve riding, eliminate slack and pound, and help the locomotive make quicker starts. They increase the capacity of new and old locomotives and reduce operating and maintenance costs.

FRANKLIN RAILWAY SUPPLY COMPANY, INC.

NEW YORK CHICAGO MONTREAL

not long afterwards, it denied the railways the right to pick up live stock by truck for rail haul to market. It is interesting to note, in this regard, that shortly afterwards the National Livestock Loss Prevention Board reported that three times as many animals are killed in transit in truck hauls to market as in straight rail hauls or rail hauls after truck pick ups.

In the railway bus subsidiary field, the year 1940 was marked by expansion, including extensions of routes, the building of new stations and a marked improvement in the riding qualities and comfort of equipment. Just as the railways have pioneered in air-conditioning in the last decade, the railway bus subsidiaries have pioneered in air-conditioned buses. This is a development of the last two or three years, and tremendous strides were made last year, such equipment so rapidly becoming standard for main-line runs that it can no longer be considered experimental.

A development of the year was the expansion of bus detours for rail passengers in the national parks and other spots of scenic interest. One of these, the California Parlor Car Tours, which has for years supplied de luxe bus tours between San Francisco and Los Angeles for transcontinental rail passengers, inaugurated medium-priced tours for the first time early last year. These have proved popular with the increasing number of transcontinental coach and tourist passengers who are visiting California. All-expense tour business was also expanded materially.

The streamlined trains have brought a marked increase in the number of feeder bus lines operated, not only to serve nearby cities but also to widen the area receiving the benefit of the fast service. For example, when the streamlined East Wind was inaugurated between Washington, New York and New England, the bus schedules of the Boston & Maine and the Maine Central transport companies were revised to make connections with this train at various points and thereby extend the benefit of this fast service to towns in the New England vacation area not directly on the route to the East Wind.

The following are typical examples of developments in this field during the last year.

Co-incident with the establishment of the new streamlined Gulf Coast Rebels, the G. M. & O. now operates its trains to and from East St. Louis only, with train-connection buses serving downtown St. Louis as well as the union station there. This road has also acquired routes in Southern Illinois and through its subsidiary, the Gulf Transport Company, has expanded its bus operations in Mississippi and Alabama.

To give better service and more efficient operations, the Union Pacific Stages of California were merged with the Interstate Transit Lines during the year, the latter company being a wholly-owned subsidiary of the U. P.-C. & N. W.

The Pennsylvania Greyhound and the New England Greyhound lines are spending more than $250,000 between them for the improvement of stations and rest-stop facilities.

The Northwestern Pacific is replacing its train-ferry commuter service between San Francisco and Marin County suburbs with buses operated over the Golden Gate bridge by the Pacific Greyhound Lines.

The Spokane, Portland & Seattle has expanded its bus services in Oregon.

The national defense program has also caused an expansion in railway-bus service. In handling soldiers and draftees to various encampments, several railways have made use of auxiliary bus service, and in some instances, railway subsidiaries are now bidding on contracts for handling soldiers on daily bus schedules between cantonments and adjacent large cities.

Co-ordinated rail-highway freight service continued its expansion during 1940. Apart from trucks used in intercity revenue runs, the use of trucks in station-to-station interchange within one terminal, either between the stations and sub-stations of one line or in interline traffic between stations, has increased to such an extent that this type of operation has almost entirely replaced the trap and ferry cars that were formerly switched about the terminals. Trucks for handling stores materials are increasing in number, as are trucks for handling men and tools for maintenance of way, water service and other gangs.

An important development during the year was the clarification of the status of the Railway Express Agency under the Motor Carrier Act by the I. C. C. Late in the year also, this company appeared before the Pennsylvania Public Service Commission in an attempt to clarify its status in that state where considerable difficulties have been encountered. The R. E. A., operator of one of the largest truck fleets in the country, has been actively soliciting its owner railways all year to handle their trucking services.

Examples of motor truck development activities during the year follow:

The Willett Company of Indiana and the Pennsylvania Truck Lines, both affiliates of the Pennsylvania, acquired operating certificates and extended their truck routes in connection with rail service in several of the states in which the Pennsylvania operates.

The Frisco Transport Company, wholly-owned subsidiary of the St. Louis-San Francisco, expanded its operations in Arkansas and Missouri by the purchase of truck lines.

The Rock Island Transport Company established new truck routes in Iowa and Texas.

The Louisiana & Arkansas inaugurated a Dallas-Shreveport and other shorter truck routes.

The Missouri Pacific materially extended its service in Louisiana and Texas.

The Southern Pacific established new truck routes in California and Arizona, and, through the purchase of the Pacific Truck Express by the railway subsidiary, the Pacific Motor Trucking Company, acquired a large fleet as well as operating rights in Oregon.

The Atlantic Coast Line began proceedings for the establishment of a highway freight subsidiary.

The Southwestern Transportation Company further increased its large fleet of trucks to serve the territory of the St. Louis Southwestern, the owning railway.

Subsidiaries of the Burlington, the Northern Pacific and the G. M. & O. are among other companies which increased and expanded their services during 1940.

The accompanying list of orders for highway vehicles shows that during 1940 railroads and their reporting subsidiaries and affiliates placed orders for a total of 646 motor buses and 2,751 units of highway freight equipment (1,934 trucks, 311 tractors and 506 trailers) and 302 automobiles. Three of the latter were designed to be operated on rails as well as highways by application of special devices. In addition, two combination vehicles for both passenger and freight service were ordered. This compares with 393 motor buses, 1,638 units of highway freight equipment and 263 automobiles ordered during 1939. Canadian roads and their affiliates placed orders for 10 buses during the year.

The list of orders, which has been compiled from questionnaire-reports from the railroads and their reporting subsidiaries, is presented with the purpose of indicating the possibilities in, and the trend of, the railroad

market for automotive equipment, and no brief is held for its completeness. It should be noted furthermore that the list does not include substantial replacements and additions to the truck fleets of the many contract carriers which perform collection and delivery and local freight services for the railroads.

Orders for Highway Vehicles

Purchaser	No.	Type of Vehicle	Seating capacity or truck capacity in tons	Where to be used	Manufacturer
Alabama Great Southern	1	Truck	1½ ton	Co. Business	Int. Harvester
Alton & Southern	1	Truck	½ ton	Co. Business	Chevrolet
	1	Truck	3 ton	Co. Business	Int. Harvester
Atchison, Topeka & Santa Fe					
Santa Fe Trail Transportation Co.	22	Bus	37	Rev.	a.c.f. Motors
	7	Bus	29	Rev.	a.c.f. Motors
	15	Truck	1½ ton	Rev.	Ford
	4	Tractor	3 ton	Rev.	Int. Harvester
	4	Tractor	2½ ton	Rev.	General Motors
	2	Tractor	2 ton	Rev.	Ford
	8	Trailer	3 ton	Rev.	Fruehauf
	2	Trailer	3 ton	Rev.	Spencer Trailer Co.
	7	Automobile	5	Co. Business	Chrysler
Southern Kansas Greyhound Lines, Inc.	1	Bus	18	Rev.	Flxible
Santa Fe Transportation Co. (California)	5	Bus	33	Rev.	a.c.f. Motors
	2	Bus	29	Rev.	a.c.f. Motors
	2	Truck	1½ ton	Rev.	Ford
	1	Truck	3 ton	Rev.	General Motors
	1	Truck	¾ ton	Rev.	General Motors
	1	Truck	1½ ton	Rev.	Chrysler
	1	Truck	¾ ton	Rev.	Chrysler
	1	Tractor	¾ ton	Rev.	Int. Harvester
Santa Fe Transportation Co. (Delaware)	1	Bus	12	Rev.	General Motors
	1	Truck	1½ ton	Rev.	Ford
Baltimore & Ohio	2	Truck	1½ ton	Co. Business	Chevrolet
	1	Truck	¾ ton	Co. Business	Chevrolet
	1	Truck	¾ ton	Co. Business	Chrysler
	6	Automobile	.....	Co. Business	Chevrolet
	6	Automobile	.....	Co. Business	Ford
	1	Automobile	.....	Co. Business	Chrysler
Bangor & Aroostook					
Bangor & Aroostook Transportation Co.	2	Bus	29	Rev.	General Motors
Bessemer & Lake Erie	1	Truck	2 ton	Co. Business	General Motors
Boston & Maine	2	Bus	8	Co. Business	.....
	3	Automobile	5	Co. Business	.....
Boston & Maine Transportation Co.	10	Bus	29	Rev.	.....
	2	Bus	37	Rev.	.....
	1	Bus	32	Rev.	.....
	2	Truck	4 ton	Rev.	.....
	1	Truck	2 ton	Rev.	.....
	1	Truck	4½ ton	Rev.	.....
	1	Truck	5 ton	Rev.	.....
	1	Tractor	10 ton	Rev.	.....
	1	Automobile	7	Rev.	.....
Butte, Anaconda & Pacific	1	Truck	½ ton	Co. Business	General Motors
Cambria & Indiana	1	Truck	½ ton	Co. Business	Chevrolet
Canton	1	Truck	½ ton	Co. Business	Chevrolet
Chesapeake & Ohio	1	Bus	.....	Co. Business	Chevrolet
	3	Truck	½ ton	Co. Business	Chevrolet
	1	Truck	1½ ton	Co. Business	Dodge
	1	Truck	1½ ton	Co. Business	Ford
	2	Truck	½ ton	Co. Business	Dodge
	1	Truck	.....	Co. Business	Dodge
	1	Truck	1½ ton	Co. Business	Int. Harvester
	3	Automobile	5	Co. Business	Ford
Chicago, Burlington & Quincy	3	Truck	2-3 ton	Co. Business	Int. Harvester
	3	Automobile*	5	Co. Business	Ford
	2	Automobile	5	Co. Business	Ford
	2	Automobile	2	Co. Business	Ford
	1	Automobile	5	Co. Business	Plymouth
	1	Automobile	5	Co. Business	Packard
Burlington Transportation Co.	15	Bus (Diesel)	33	Rev.	General Motors
	4	Bus	13	Rev.	Kalamazoo Coaches
	2	Truck	2 ton	Rev.	Dodge
	2	Tractor	3 ton	Rev.	Dodge
	6	Tractor	2 ton	Rev.	Int. Harvester
	4	Tractor	3 ton	Rev.	Int. Harvester
	2	Tractor (Diesel)	3 ton	Rev.	General Motors
	11	Trailer	10 ton	Rev.	Fruehauf
	2	Trailer	10 ton	Rev.	Fruehauf
Chicago, Milwaukee, St. Paul & Pacific	6	Bus	.....	.....	.....
	1	Bus	14	.....	.....
	1	Bus	11	.....	.....
	7	Truck	1½ ton	.....	.....
	5	Truck	½ ton	.....	.....
	1	Truck	¾ ton	.....	.....
	11	Automobile	5	.....	.....
	1	Automobile	3	.....	.....
	1	Automobile	8	.....	.....
Chicago, Rock Island & Pacific					
Rock Island Motor Transit Co.	3	Truck	1½ ton	Rev.	.....
	22	Tractor	2 ton	Rev.	.....
	12	Trailer	10 ton	Rev.	.....
Cincinnati, New Orleans & Texas Pacific	1	Truck	1½ ton	Co. Business	Int. Harvester
Delaware & Hudson	1	Truck	1½ ton	Co. Business	Ford
Delaware, Lackawanna & Western	1	Bus	.....	Co. Business	.....
	7	Truck	.....	Co. Business	.....
Denver & Rio Grande Western					
Rio Grande Motor Way—Denver, Colorado Springs, Pueblo Motor Way—Denver Salt Lake Pacific Motor Way	5	Bus	13	Rev.	.....
	4	Bus	6	Rev.	.....
	3	Bus (Diesel)	29	Rev.	.....
	3	Bus	37	Rev.	.....
	2	Bus	29	Rev.	.....
	2	Bus-Truck (Diesel)	6 Pass. 5 ton	Rev.	.....
	14	Tractor (Diesel)	.....	Rev.	.....
	17	Trailer	12 ton	Rev.	.....
	5	Trailer	8 ton	Rev.	.....
	2	Trailer	12½ ton	Rev.	.....

* Fitted for rail service.

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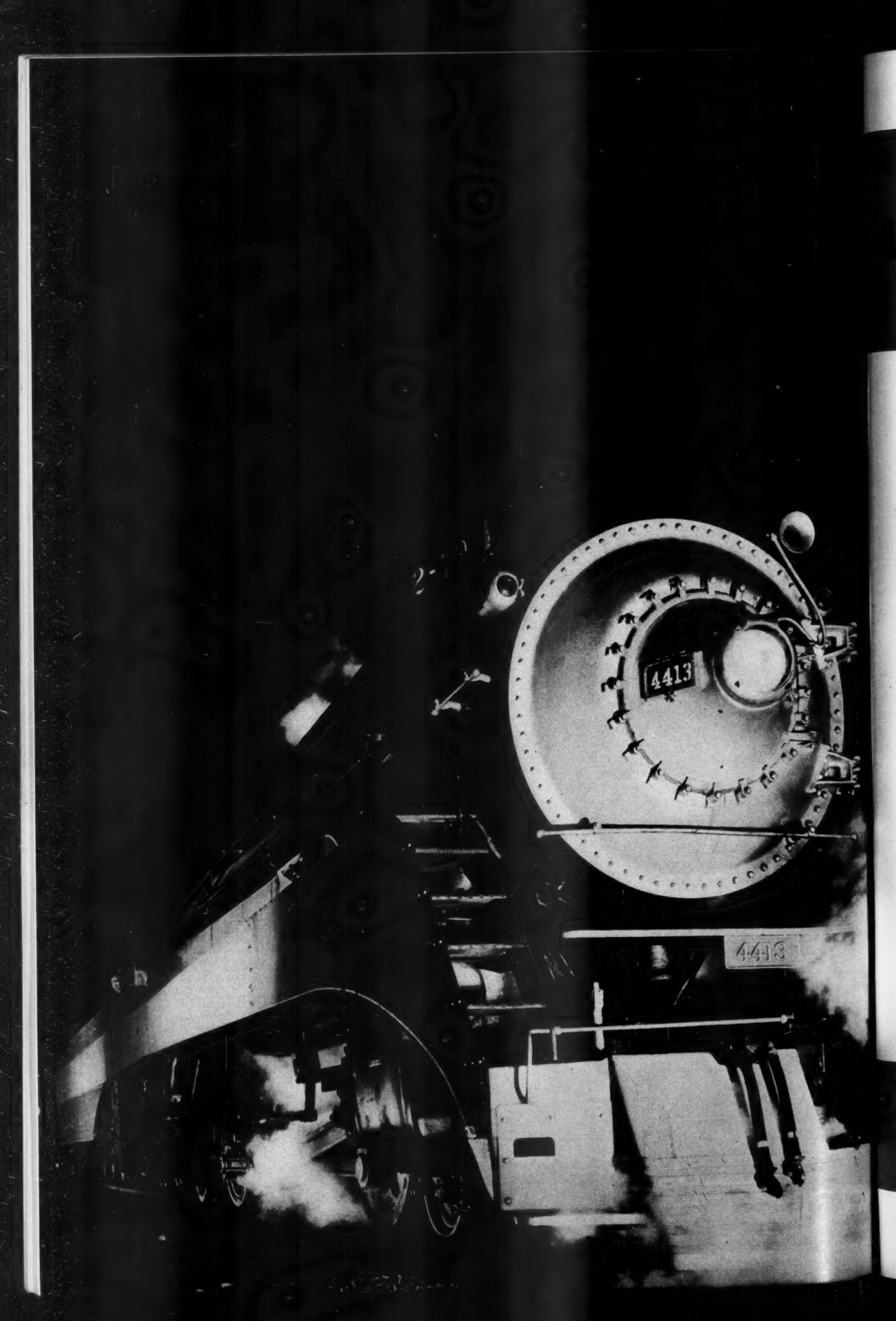
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APPLICATION OF SECURITY CIRCULATORS

AVAILABILITY

Security Circulator Equipped Locomotives are available for continuous operation over longer periods of time than other locomotives, due to the fact that Security Circulator Locomotives have cleaner flues, give excellent arch life and better combustion qualities with the result that considerably less boiler maintenance is required.

ADAPTABILITY

To any type of locomotive.

IMPROVED CIRCULATION

in side water-legs and over crown sheets.

REDUCES

Honeycombing, flue plugging and cinder cutting.

IDEAL SUPPORT

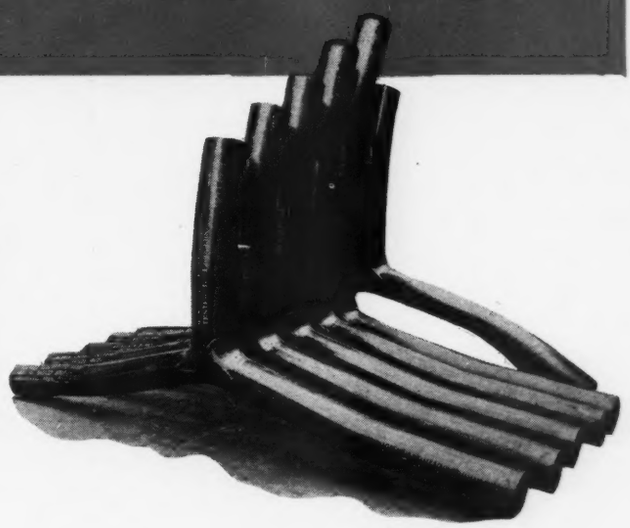
For crown sheets, and for arch brick.

PERMITS

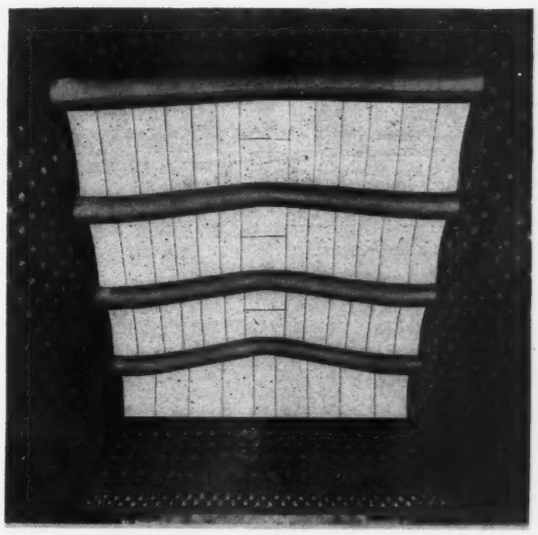
the use of 100% arch in any type firebox.

BRICK ARCH LIFE

increased, resulting in less maintenance.



A typical set of Security Circulators prior to installation in locomotive.



Typical Security Circulator and brick Arch Installation in a locomotive firebox. The small sectional brick are as readily applied as in an ordinary arch tube firebox.

SECURITY CIRCULATOR MEANS ALL THAT THE NAME IMPLIES

COMPANY, INC.

NEW YORK CHICAGO

Purchaser	No.	Type of Vehicle	Seating capacity or truck capacity in tons	Where to be used	Manufacturer
Detroit & Mackinac	1	Truck	1½ ton	Rev.	Ford
	1	Automobile	5	Co. Business	Ford
Detroit, Toledo & Ironton	1	Truck	½ ton	Co. Business	Ford
	7	Automobile	5	Co. Business	Ford
	1	Automobile	5	Co. Business	Lincoln
Erie	2	Truck	½ ton	Co. Business	Chevrolet
	1	Truck	.....	Co. Business	Int. Harvester
	17	Automobile	.....	Co. Business	Chevrolet
	2	Automobile	5	Co. Business	Ford
	7	Automobile	5	Co. Business	Plymouth
Gulf Coast Lines	1	Truck	½ ton	Co. Business	General Motors
	5	Automobile	.....	Co. Business	General Motors
	1	Automobile	.....	Co. Business	Ford
Gulf, Mobile & Ohio					
Gulf Transport Co.	4	Bus	29	Rev.	Flxible
	2	Bus	29	Rev.	General Motors
	1	Bus	29	Rev.	Fitzjohn
	4	Tractor	2½ ton	Rev.	Int. Harvester
	3	Tractor	2½ ton	Rev.	General Motors
	2	Trailer	.....	Rev.	Carter Mfg. Co.
	2	Trailer	.....	Rev.	Kingham Co.
	1	Trailer	.....	Rev.	Dorsey Mfg. Co.
Illinois Terminal	1	Bus	24	Rev.	General Motors
International-Great Northern	1	Automobile	.....	Co. Business	General Motors
Interstate	1	Truck	¾ ton	Co. Business	Chevrolet
	1	Truck	½ ton	Co. Business	Chevrolet
Kansas City Southern	1	Truck	1½ ton	Co. Business	Dodge
	1	Automobile	5	Co. Business	Chevrolet
Kansas City Southern Transport Co.	1	Truck	1½ ton	Rev.	Dodge
	3	Tractor	1½ ton	Rev.	Chevrolet
	2	Tractor	1½ ton	Rev.	Ford
	2	Trailer	5 ton	Rev.	Nabors
Long Island	1	Truck	3 ton	Co. Business	.....
	1	Automobile	5	Co. Business	.....
Louisiana & Arkansas					
Louisiana, Arkansas & Texas Transportation Co.	1	Bus	.....	.....	Flxible
	5	Truck	1½ ton	.....	Int. Harvester
	2	Tractor	2 ton	.....	Int. Harvester
	2	Tractor	1½ ton	.....	Int. Harvester
	1	Tractor	1½ ton	.....	Chevrolet
	1	Trailer	10 ton	.....	Fruehauf
	2	Trailer	10 ton	.....	Nabors
Maine Central	1	Truck	1½ ton	Co. Business	General Motors
	1	Truck	¾ ton	Co. Business	Chevrolet
	1	Truck	2½ ton	Co. Business	General Motors
Maine Central Transportation Co.	5	Bus	29	Rev.	General Motors
	2	Truck	1½ ton	Rev.	Chevrolet
Minneapolis & St. Louis	3	Automobile	5	Co. Business	Plymouth
	2	Automobile	5	Co. Business	Chrysler
Minneapolis, St. Paul & Sault Ste. Marie	2	Truck	1 ton	Co. Business	Ford
	2	Automobile	5	Co. Business	Chevrolet
Mississippi Central	1	Automobile	.....	Co. Business	Ford
Missouri-Illinois	1	Automobile	5	Co. Business	Chevrolet
Missouri Pacific	2	Truck	1½ ton	Co. Business	Chevrolet
	1	Truck	.....	Co. Business	Chevrolet
	1	Truck	.....	Co. Business	Ford
	23	Automobile	5	Co. Business	Chevrolet
	4	Automobile	5	Co. Business	Plymouth
	2	Automobile	5	Co. Business	Ford
	1	Automobile	.....	Co. Business	Buick
	1	Automobile	3	Co. Business	Ford
	1	Automobile	3	Co. Business	Chevrolet
Monongahela	1	Truck	½ ton	Co. Business	Ford
Nevada Northern	1	Automobile	.....	Co. Business	General Motors
New York Central	5	Truck	½ ton	Co. Business	.....
	2	Truck	1½ ton	Co. Business	.....
	2	Truck	1½-2 ton	Co. Business	.....
	2	Truck	1 ton	Co. Business	.....
	1	Truck	1½ ton	Co. Business	.....
	1	Truck	6 ton	Co. Business	.....
	1	Truck	2 ton	Co. Business	.....
	1	Truck	3 ton	Co. Business	.....
Central Greyhound Lines	54	Bus	37	Rev.	General Motors
	20	Bus	41	Rev.	General Motors
	13	Bus	25	Rev.	General Motors
New York, Chicago & St. Louis	1	Truck	½ ton	Co. Business	Chevrolet
	1	Truck	¾ ton	Co. Business	Int. Harvester
New York, New Haven & Hartford	1	Bus	9	Co. Business	.....
	50	Truck	3 ton	Co. Business	.....
	13	Truck	¾ ton	Co. Business	.....
	1	Truck	1½ ton	Co. Business	.....
	2	Truck	1 ton	Co. Business	.....
	13	Automobile	5	Co. Business	.....
New Haven highway subsidiaries	5	Bus	37	Rev.	.....
	5	Bus	32	Rev.	.....
	5	Bus	27	Rev.	.....
	5	Bus	36	Rev.	.....
	3	Bus	29	Rev.	.....
	3	Bus	18	Rev.	.....
	2	Bus	29	Rev.	.....
	2	Bus	25	Rev.	.....
	1	Bus	44	Rev.	.....
	10	Truck	15 ton	Rev.	.....
	1	Truck	½ ton	Co. Business	.....
	1	Truck	2 ton	Co. Business	.....
	1	Truck (Wreck)	10 ton	Co. Business	.....
	5	Tractor	10 ton	Rev.	.....
	10	Trailer	10 ton	Rev.	.....
	1	Automobile	5	Co. Business	.....
	1	Automobile	8	Co. Business	.....
Niagara Junction	1	Automobile	.....	Co. Business	Ford
Norfolk & Western	3	Truck	½ ton	Co. Business	Ford
	1	Truck	1½ ton	Co. Business	Ford
	1	Truck	½ ton	Co. Business	Dodge
	6	Automobile	5	Co. Business	Chevrolet
	2	Automobile	5	Co. Business	Ford
Norfolk Southern					
Norfolk Southern Bus Corp	4	Bus	29	Rev.	Flxible
	1	Bus	37	Rev.	a.c.f. Motors
	1	Bus	25	Rev.	Flxible
Northeast Oklahoma	2	Bus	24	Rev.	General Motors

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Purchaser	No.	Type of Vehicle	Seating capacity or truck capacity in tons	Where to be used	Manufacturer
Northern Pacific					
Northern Pacific Transport Co.	3	Bus	25	Rev.	General Motors
	1	Bus	11	Rev.	Chevrolet
	1	Truck	1 ton	Rev.	Int. Harvester
	1	Truck	1½ ton	Rev.	Int. Harvester
	1	Truck	7 ton	Rev.	White
	3	Trailer	3½ ton	Rev.	Brown Industries
	2	Automobile	5	Co. Business	Chevrolet
Yellowstone Park Co.	1	Truck	1 ton	Co. Business	Ford
	1	Automobile	.....	Co. Business	Ford
Northwestern Improvement Co.	1	Truck	2 ton	Co. Business	Dodge
	1	Truck	1½ ton	Co. Business	Chevrolet
Pacific Electric	40	Bus	45	Rev.	General Motors
	15	Bus	35	Rev.	Twin Coach
	10	Bus	37	Rev.	General Motors
	25	Bus	41	Rev.	Twin Coach
	24	Bus	41	Rev.	White
	3	Bus	30	Rev.	Twin Coach
	1	Bus	.....	Co. Business	Chevrolet
	1	Truck	.....	Co. Business	Chrysler
	1	Truck	1½ ton	Co. Business	General Motors
	1	Truck	¾ ton	Co. Business	Chevrolet
Pennsylvania	20	Truck	1½ ton	Co. Business	.....
	6	Truck	1 ton	Co. Business	.....
	5	Truck	½ ton	Co. Business	.....
	4	Truck	2 ton	Co. Business	.....
	4	Truck	3 ton	Co. Business	.....
	2	Truck	4 ton	Co. Business	.....
	1	Truck	2½ ton	Co. Business	.....
	1	Truck	5 ton	Co. Business	.....
	1	Truck	¾ ton	Co. Business	.....
	5	Automobile	5	Co. Business	.....
Pennsylvania highway affiliates	20	Bus	41	Rev.	.....
	16	Bus	37	Rev.	.....
	9	Bus	29	Rev.	.....
	5	Bus	25	Rev.	.....
	97	Truck	Less than 3 ton	Rev.	.....
	15	Truck	3-5 ton	Rev.	.....
	4	Truck	Over 10 ton	Rev.	.....
	3	Truck	5-10 ton	Rev.	.....
	85	Tractor	Less than 3 ton	Rev.	.....
	20	Tractor	3-5 ton	Rev.	.....
	6	Tractor	5-10 ton	Rev.	.....
	1	Tractor	Over 10 ton	Rev.	.....
	56	Trailer	5-10 ton	Rev.	.....
	43	Trailer	3-5 ton	Rev.	.....
	41	Trailer	Over 10 ton	Rev.	.....
	6	Automobile	.....	Co. Business	.....
Pennsylvania-Reading Seashore Lines	1	Truck	3 ton	Co. Business	Ford
	1	Truck	1 ton	Co. Business	Ford
	1	Truck	3 ton	Co. Business	Dodge
	1	Automobile	2	Co. Business	General Motors
Pere Marquette	2	Truck	.....	Co. Business	Ford
	1	Truck	½ ton	Co. Business	Dodge
Railway Express Agency	1,489	Truck	Light duty	.....	.....
	81	Tractor	.....	.....	.....
	260	Trailer	.....	.....	.....
	57	Automobile	.....	.....	.....
Reading					
Reading Transportation Co.	8	Bus	29	Rev.	General Motors
	7	Bus	29	Rev.	Ford
	5	Bus	29	Rev.	Flxible
St. Louis-San Francisco					
Frisco Transportation Co.	9	Trailer	9 ton	Rev.	Superior
	6	Trailer	9 ton	Rev.	Springfield
St. Louis Southwestern	1	Automobile	5	Co. Business	Chevrolet
	1	Automobile	5	Co. Business	Plymouth
Southwestern Transportation Co.	5	Truck	1½ ton	Rev.	Dodge
	1	Truck	1½ ton	Rev.	Int. Harvester
	1	Truck	½ ton	Co. Business	Ford
	1	Truck	½ ton	Co. Business	Chevrolet
	7	Tractor	2 ton	Rev.	White
	1	Automobile	5	Co. Business	Dodge
	1	Automobile	5	Co. Business	Chevrolet
Southwestern Greyhound Lines, Inc.	40	Bus	37	Rev.	General Motors
	7	Bus	25	Rev.	General Motors
Seaboard Air Line	3	Truck	1½ ton	Co. Business	Chevrolet
	3	Truck	1½ ton	Co. Business	Int. Harvester
	1	Tractor	.....	Co. Business	Federal
	21	Automobile	.....	Co. Business	Chevrolet
	2	Automobile	.....	Co. Business	Ford
	3	Automobile	.....	Co. Business	Chrysler
	1	Automobile	.....	Co. Business	Pontiac
	1	Automobile	.....	Co. Business	Studebaker
Southern	3	Truck	1½ ton	Co. Business	Int. Harvester
	1	Truck	1½-4 ton	Co. Business	White
	1	Tractor	.....	Co. Business	Int. Harvester
Southern Pacific	9	Truck	½ ton	Co. Business	.....
	2	Truck	1½ ton	Co. Business	.....
	10	Automobile	5	Co. Business	.....
Pacific Motor Trucking Co.	4	Truck	1½ ton	Rev.	.....
	4	Truck	2½ ton	Rev.	.....
	2	Truck	2 ton	Rev.	.....
	1	Truck	½ ton	Co. Business	.....
	6	Tractor	.....	Rev.	.....
	2	Automobile	5	Co. Business	.....
Pacific Greyhound Lines	84	Bus (Diesel)	45	Rev.	General Motors
	65	Bus (Diesel)	42	Rev.	General Motors
	6	Automobile	5	Co. Business	Chevrolet
South Georgia	1	Bus	31	Rev.	Kalamazoo Ry. Supply Co.
Texas & New Orleans	2	Truck	1½ ton	Co. Business	Ford
	1	Truck	1½ ton	Co. Business	Chevrolet
	1	Truck	3 ton	Co. Business	Int. Harvester
	1	Automobile	5	Co. Business	Chevrolet
Southern Pacific Transport Co.	5	Tractor	1½ ton	Rev.	Chevrolet
	1	Tractor	1½ ton	Rev.	Int. Harvester
	3	Trailer	1½ ton	Rev.	Nabors
	1	Automobile	3	Co. Business	Plymouth
	1	Automobile	3	Co. Business	Ford
Texas & Pacific	5	Automobile	2	Co. Business	Ford
	3	Automobile	5	Co. Business	Ford
	2	Automobile	5	Co. Business	Chevrolet
	2	Automobile	5	Co. Business	Dodge

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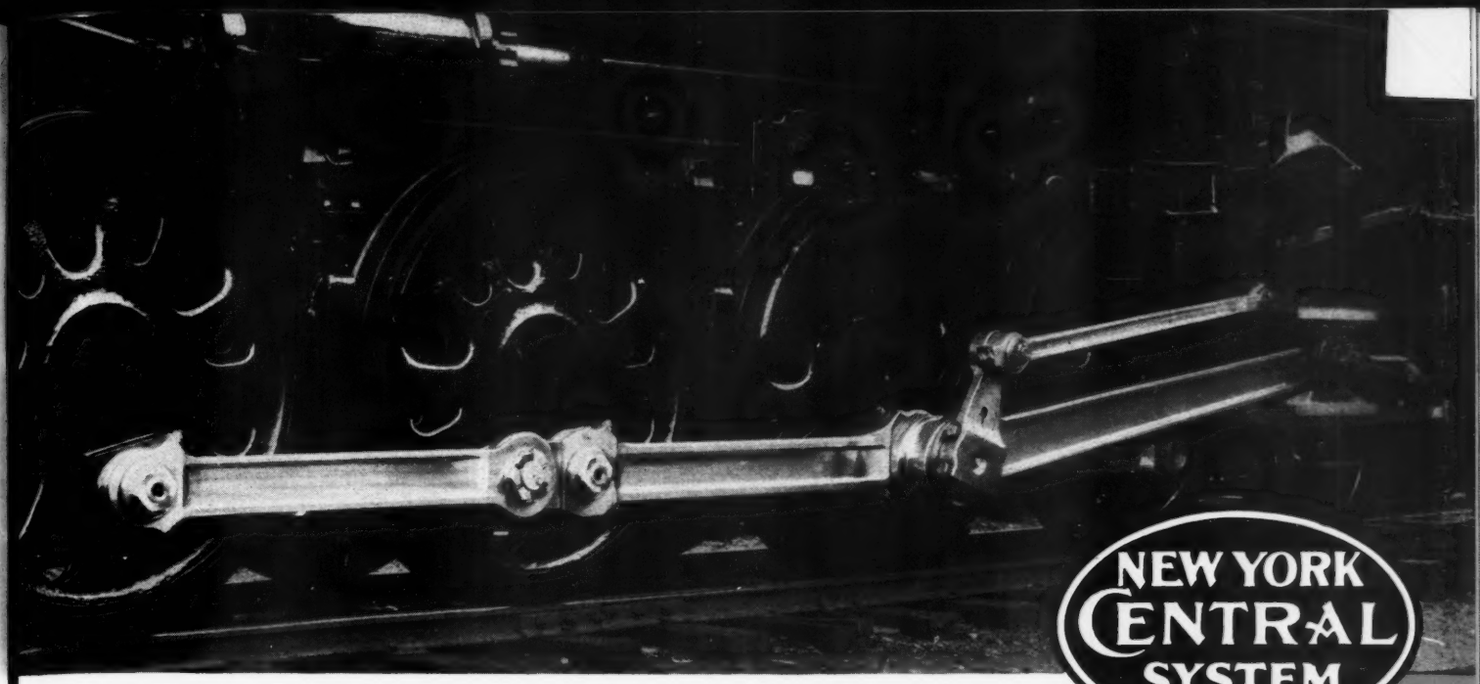
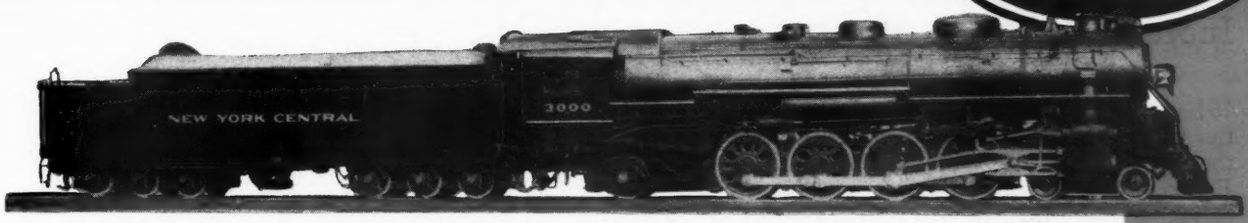




her Mileage Between Shoppings Costs — Decreased Maintenance

IN recent years the serviceability of modern locomotives with their light weight revolving and reciprocating parts has been much improved. In fact it is the application and reliable performance of high grade light weight forgings that has made possible the longer engine runs, and higher mileages between shoppings.

The vital part which reliable forgings play in achieving low-cost trouble-free operation is too important to gamble with. Only the highest grade forgings can keep up the tempo of up-to-date fast schedules. Alco manufacture assures the toughest shock-resisting forgings which meet the stiffest requirements of high speed heavy duty operation. Alco light weight forgings with less poundage and less pounding not only protect locomotive service but reduce locomotive and track maintenance.

AMERICAN LOCOMOTIVE COMPANY
30 CHURCH STREET **NEW YORK, N. Y.**

Purchaser	No.	Type of Vehicle	Seating capacity or truck capacity in tons	Where to be used	Manufacturer
Texas & Pacific Motor Transport Co.	5	Truck	2½ ton	Rev.	Ford
	4	Truck	2½ ton	Rev.	Chevrolet
	2	Truck	1½ ton	Rev.	Int. Harvester
	2	Truck	2½ ton	Rev.	Dodge
	9	Tractor	2½ ton	Rev.	Ford
	4	Tractor	2-3 ton	Rev.	Chevrolet
	6	Trailer	3½ ton	Rev.	Nabors
Toledo Terminal	1	Automobile	5	Co. Business	Ford
Union Pacific					
Interstate Transit Lines	10	Bus	37	Rev.	General Motors
	3	Bus	33	Rev.	General Motors
Union Pacific Stages, Inc.	2	Bus	33	Rev.	Twin Coach
	1	Automobile	5	Co. Business	Ford
Utah Parks Co.	2	Truck	1½ ton	Co. Business	General Motors
	3	Automobile	7	Rev.	General Motors
	1	Automobile	4	Co. Business	Ford
Western Maryland	2	Truck	1½ ton	Co. Business	Dodge
Canada					
British Columbia Electric	7	Bus	31	Rev.	Twin Coach
Temiskaming & Northern Ontario	2	Bus	29	Rev.	Reo
	1	Bus	26	Rev.	White

Communication Facilities Increased During 1940

(*Continued from page 113*)

191 miles. For use on long-distance telephone circuits, the Chesapeake & Ohio installed carrier on 255 miles, the Central of Georgia on 191 miles, the St. Louis-San Francisco on 124 miles, and the Southern Pacific on 1,490 miles. Other carrier installations last year included 338 miles on the Southern, 148 miles on the San Diego & Arizona Southern, 694 miles on the Texas & Pacific, and 278 miles on the Wabash.

Local Communication

The application of carrier systems, as explained above, permits telegraph message and telephone service between principal offices to be handled over a very few wires, thus releasing other existing line wires for use as local telephone circuits between stations and division headquarters. This opens an opportunity for the installation of telephone train dispatching where such systems are not now in service. The next step is the use of released line wires for telephone service between the agents at the various stations and their respective divisional offices so that the customers in the smaller cities can be given the same rapid service that is available in the larger centers.

Local telephone service between offices, yards, enginehouses, shops, etc., within a terminal area, can be handled efficiently and economically by railroad-owned private automatic exchange systems. For example, the Louisville & Nashville has railroad-owned private automatic telephone exchanges in service at 11 different points, totaling 797 telephones. Calls between certain terminals can be established by dialing through two or more exchanges. The Atlantic Coast Line, which previously had a comprehensive system, is now installing a 100-line private automatic exchange at Rocky Mount, N. C., and is making additions to existing automatic systems at Wilmington, N. C., and Savannah, Ga.

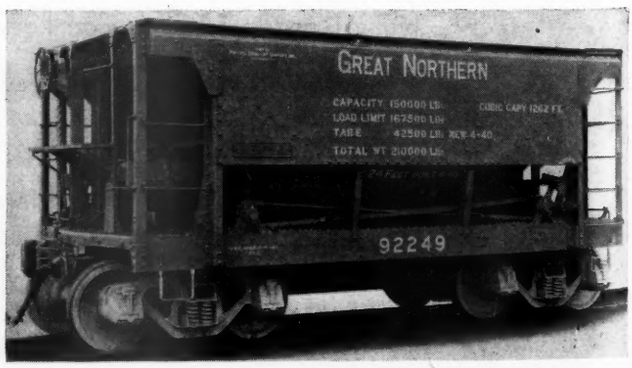
Train and Yard Communication

In past years, ordinary broadcast radio has been used for a two-way telephone communication between trains and wayside stations, as well as between yard locomotives and humpmasters' offices in freight classification yards. The application of this radio system has been discouraged by the fact that practically all of the available radio frequency wave bands have been assigned by Federal authorities for use in other fields. Efforts have been directed, therefore, to the development of means to utilize the rails in conjunction with wires on pole lines to transmit radio frequencies, thus preventing interference with broadcasted radio and also insuring secrecy. The first project of this character for regular permanent service was installed on the Bessemer & Lake Erie during 1940 for communication between the locomotives and cabooses of freight trains on 128 miles of road between Albion, Pa., and Pittsburgh, as was described in an article on page 114 of the *Railway Age* for July 20. Equipment of the same general character for communication between the humpmaster and the engineman of the humping locomotive was installed during 1940 in one yard each on the Louisville & Nashville, the Pennsylvania and the Cleveland, Cincinnati, Chicago & St. Louis.

Communication on Trains

A new phase of communication which was included in several of the new light-weight streamlined trains placed in service in 1940, was the provision of an intercommunicating system with telephones in the various cars. Telephones are provided also in the engineman's compartment on the trains using Diesel-electric locomotives. Passengers can call the dining car steward or the attendant in the club cars, or passengers in one car can talk to other passengers in other cars. Furthermore, the telephone system is used by the train and engine crews to report matters with reference to train operation. Thus, although provided primarily for the convenience of passengers, the telephone system is being used also to advantage by the crews.

* * *



One of the 750 Ore Cars Constructed by the Pressed Steel Car Company for the Great Northern—It Has a Capacity of 150,000 Lb.

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NEWS

Ted Rodgers Sees '41 as Good Year

Trucking spokesman very happy about everything except "trade barriers"

Making his year-end statement on the trucking industry, Ted V. Rodgers, president of American Trucking Associations, Inc., coupled a prediction of "further gains in 1941" with a "defense-crisis" appeal for the removal of "interstate trade barriers" and "punitive regulations which will prevent the industry from serving the nation."

The 1940 volume of freight transported by truck, Mr. Rodgers said, showed the most substantial gains since 1935, although final figures for last year had not been compiled when he prepared his statement. His expectations for an even better 1941 are based upon anticipated defense-program traffic and his finding that "appreciation of the services of the motor truck is becoming more wide-spread every year." The A. T. A. president went on to note a "distinct tendency toward strengthening" of motor lines by the formation of "larger and stronger companies." "This," he added, "is a logical step. It follows the trend in other great industries. The public is entitled to economies of modern transportation methods. If the trend toward stronger truck lines will permit motor transportation to serve its customers and the public better, then the movement cannot help but be successful."

Next came Mr. Rodgers' aforementioned complaint about "trade barriers" which took up the remainder of his statement. He said: "Efforts have been made to hamstring our industry with punitive regulations. Truck operators recognize the wisdom of regulation in the public interest; we have been under the supervision of the federal government since 1935. But the industry certainly is opposed to measures designed merely to render it less effective as a public servant. With the nation now facing one of the most critical periods in its history, speedy and economical transportation is more vital than ever. The trucking industry is cooperating in the defense program. But if maximum cooperation is to be achieved, then we must not be bound by senseless red tape and hemmed in by competitive obstacles.

"One of the problems with which we have been grappling for years is that of state trade barriers. More than 1500 of these trade walls already have been uncovered by the federal government, and many of them impede the free flow of highway transportation between the states, and actually have delayed movement of defense traffic. Such uneconomic measures are holding back an industry which has cut living costs for every one of us; which employs 3,500,000 persons, one out of every 10 wage earners in the U. S.; and which serves every community in the U. S., not to mention the 48,000 towns which depend exclusively on motor trucks for their daily needs."

Atlantic Advisory Board to Meet January 8 and 9

The Atlantic Shippers Advisory Board will hold the main sessions of its 17th annual meeting at the Biltmore hotel, New York, on January 9. A special luncheon that day will honor as guests "a galaxy of the nation's railroad presidents." Main speaker will be Judge R. V. Fletcher, vice-president, Association of American Railroads, who will discuss the subject "Facts About the Proposed St. Lawrence Waterway." On the preceding day preliminary committee meetings will be held, followed by an open meeting of the Freight Loss & Damage Prevention committee at 8 p. m.

S. P. Gives Up Claim for More Than 2,000,000 Acres of Land

Relinquishing the right of the Southern Pacific to claim more than 2,000,000 acres of public land in Southern California, a land grant claim release submitted by that railroad has been approved by Secretary of the Interior Harold L. Ickes.

Approval of the release clears the track for the S. P. to take advantage of the land-grant-rate-repeal provision of the Transportation Act of 1940.

As of December 30, 24 such releases have been approved by the Secretary of the Interior, but all save the Southern Pacific's embraced grants which had been completed and closed for some time, and no question of relinquishment of pending claims for land was involved. Thus the S. P. becomes the first road to relinquish their right to claim grants not yet completely adjusted and closed.

Involving the Central Pacific, the main line and the branch line of the Southern Pacific, original grants to these roads, made in 1864, 1866 and 1871, respectively, totaled about 16,835,000 acres of public domain. Of this original grant, the roads received title to approximately 14,725,000 acres from the United States. Claims for the 2,109,000 deficiency, brought about by insufficient suitable public land in the area to meet the requirements of the original grant, now have been released by the Southern Pacific.

Other approved releases, not previously noted, are those of Grand Trunk Western, the Chicago & North Western and the Wisconsin Central.

Why ICC Blocked Big Truck Merger

Adverse decision was based primarily on financial aspects of the case

Publication this week of the Interstate Commerce Commission's report in the Transport Company case revealed that the previously-announced adverse decision on that proposed big trucking merger was based primarily upon financial aspects of the transaction. As noted in the *Railway Age* of November 23, 1940, the commission met a request of interested parties and announced its decision on November 15 in a brief statement saying that the report and formal order would be forthcoming later.

In denying the applications, the commission rejected the recommendations of the proposed report by J. Edward Davey, chief of the Bureau of Motor Carriers' Section of Finance. The Davey report, reviewed in the *Railway Age* of October 19, 1940, page 559, had recommended approval of the major part of the applications—subject to conditions, one of which would call for labor-protection provisions for the employees affected. The commission's decision was unanimous, but it brought forth separate concurring-in-part expressions from Chairman Eastman and Commissioner Alldredge. Commissioner Rogers did not participate.

Generally speaking the application sought authority to control some 56 companies (some of them subsidiaries of the others) which reported aggregate 1939 operating revenues of $38,624,000 and net operating revenues of $2,556,000. They operate over a network of routes extending along the Atlantic seaboard from Massachusetts to Florida and into Ohio, West Virginia, Tennessee, Louisiana and Alabama. Of the 56 companies, 39 are over-the-road companies and 17 are so-called rental companies; they own and operate more than 10,000 vehicles and all except one operate more than 20 vehicles. Among the over-the-road companies is a group which conduct contract-carrier operations, or whose status as common or contract carriers has not been determined. The companies involved were listed in the aforementioned issue of October 19.

The commission's decision passes upon three phases of the proposed transaction, i. e., Transport's applications for authority to acquire the companies, its application to effect singleness of title to the operating rights of the carriers acquired, and ap-

(*Continued on page 124*)

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River Socialists Are Quite Happy

Federal Barge Line moved larger tonnage in 1940—Expects to benefit from war

While experiencing traffic losses resulting from the war in Europe and "unprecedented" ice condition which sometimes stopped operations completely, the government-owned Inland Waterways Corporation in 1940 picked up enough additional sugar, iron and steel, coal and coke and general merchandise business to make last year's total-tonnage figure higher than that of 1939. Such was the prediction of what the final figures will show, embodied in a year-end statement issued by the Corporation.

After noting the nature of the Corporation's activities as operator of the Federal Barge Lines, the statement recalls that in January, 1940, the executive offices were moved from Washington, D. C., to St. Louis, Mo. "The results of this change have been more than satisfactory." Meanwhile, "the story of water transportation on the rivers on which the Federal Barge Line operates has been for the year 1940 one of unusual difficulties but, in the aggregate, one of general improvement." Then comes the mention of the adverse effects of the war and the ice conditions, the latter cutting January and February tonnage 40 per cent as compared with 1939. The war caused a loss of about 100,000 tons of export grain traffic. However, as noted above, the offsetting rise in other traffic is expected to result in the Lines' having handled more freight in 1940 than it did in 1939.

"Considerable attention has been given during the year to improvement of terminals and equipment that will result in more efficient and economical operations in the future and will enable the Corporation to properly handle its share of the steadily increasing traffic that is moving on these important avenues of transportation," the statement went on. Total 1940 expenditure on terminal facilities have been "in excess of $100,000," including $40,000 at St. Louis, $15,000 at Vicksburg, Miss., $20,000 at Port Birmingham, Ala., and smaller amounts at Baton Rouge, La., Memphis, Tenn., Cairo, Ill., "and various other terminals." Also, "a quantity of obsolete or unused equipment and facilities have been disposed of during the year," including "two obsolete sternwheel towboats, the Thorpe and Ashburn. . . ." Fifteen large steel barges, "representing an investment of approximately $1,000,000," are now being built and are expected to be delivered early in 1941. And consideration is being given to the replacement of the floating terminal at East St. Louis, Ill., with a modern all-steel terminal, and to the building of a modern towboat for operation on the upper Mississippi and another to be used on the Illinois river.

During 1940 the Corporation's relations with its employees "and the several unions of which they are members" has been put upon "a much more mutually satisfactory basis than previously existed, and the results have been stabilization of employment, continuous operations, and generally more satisfactory conditions." Commenting on the Transportation Act of 1940 the statement said that it is too early to prophesy what may be the ultimate effect on river transportation of that "highly controversial measure." It added: "It is at least believed that this is a worthwhile step along the road of unified control of all forms of transportation in one governmental department."

The statement found a look into the future "unusually difficult this year." It recalled that the last World War "was largely responsible for the beginning of transportation on the inland waterways of this country in the form that we know it today," adding that "it is, perhaps, not too much to expect that the present great national effort will accelerate the growth of this industry." Meanwhile, "it can be said with certainty that inland waterways transportation services generally have the equipment, ability and desire to do everything that they may be called upon to do in the national defense."

A. A. R. Directors Meeting

Methods of obtaining more complete utilization of available equipment, particularly special types of freight cars such as the 50-ft., end-door box cars which are in demand for shipments of government truck orders, were discussed by directors of the Association of American Railroads at their monthly meeting in Washington, D. C., on December 27. It was stated at the A. A. R. that such discussion was confined to consideration of possibilities for more efficient utilization, and included no talk of purchasing additional cars of the special types. Also, it was said that nothing else of a newsworthy nature transpired at the meeting.

Air Lines Chalk Up Record Year

All indications thus far point to new all-time highs in air passenger, air mail and air express traffic in 1940. The Air Transport Association estimates that the industry now does a gross business of about $75,000,000 annually. As of June 30, 1940, 398 commercial airplane units were in service, having a total seating capacity of 8,968. As of the same date, air lines employed some 20,000 persons, paying them $30,000,000 a year in compensation.

According to preliminary figures compiled by the Air Transport Association, passenger traffic on the major air lines increased 61.42 per cent during the first 10 months of 1940 over the corresponding period of 1939. 1940's traffic represented 2,013,208 revenue passengers flying 890,525,153 revenue passenger-miles, as compared with 1,219,928 passengers flying 551,690,659 revenue passenger-miles in the corresponding period of the preceding year. The latest figures of the United States Post Office department show a total of 11,259,030,789 air mail lb.-miles flown in the first seven months of 1940, as compared with 9,516,103,532 in 1939. Air express shipments showed a 29.39 per cent increase in the first 10 months of 1940, as compared with the same period of 1939; a total traffic of 8,647,457 lb. was carried in the former period.

11 Months N. O. I. Was $598,201,070

2.46% return as compared with $527,847,779 or 2.18 per cent last year

Class I railroads of the United States in the first eleven months of 1940 had a net railway operating income of $598,201,070, according to the Bureau of Railway Economics of the Association of American Railroads. This was at the annual rate of return of 2.46 per cent. The Bureau estimates that the net income for the eleven months after payment of interest and rentals will be approximately $127,600,000.

In the first 11 months of 1939, their net was $527,847,779 or 2.18 per cent, and in the first 11 months of 1930, it was $820,214,052 or 3.38 per cent. The November net was $71,098,917 or 3.32 per cent compared with $70,414,616 or 3.29 per cent in November, 1939, and $61,175,416 or 2.88 per cent in November, 1930.

Gross operating revenues for the first 11 months of 1940 totaled $3,914,808,946 compared with $3,649,823,992 for the same period in 1939, and $4,906,580,018 for the same period in 1930, an increase of 7.3 per cent in 1940 above 1939, but 20.2 per cent below 1930. Operating expenses amounted to $2,823,340,009 compared with $2,669,203,173 for the same period in 1939, and $3,636,468,116 for the same period in 1930—5.8 per cent above the former, but 22.4 per cent below 1930.

Class I railroads in the eleven months paid $374,740,170 in taxes compared with $331,450,857 in the same period in 1939, and $328,645,340 in the same period in 1930. For November alone the tax bill amounted to $34,080,361 an increase of $3,581,559 or 11.7 per cent above November, 1939. Nineteen Class I roads failed to earn expenses and taxes in the first eleven months of 1940, of which six were in the Eastern district, four in the Southern district, and nine in the Western district.

Gross for November amounted to $375,363,842 compared with $368,026,739 in November, 1939, and $394,261,533 in November, 1930. Operating expenses totaled $259,454,782 compared with $256,170,301 in the same month in 1939, and $295,812,115 in November, 1930.

Class I roads in the Eastern district for the first 11 months had a net of $330,097,659 or 2.93 per cent; for the same period in 1939, their net was $296,553,560 or 2.63 per cent, while in 1930 it was $416,555,979 or 3.78 per cent. Gross in the Eastern district for the 11 months totaled $1,961,712,610 an increase of 9.6 per cent compared with 1939, but a decrease of 19.4 per cent compared with 1930; operating expenses totaled $1,375,275,501 an increase of 8.2 per cent above the same period in 1939, but a decrease of 23.8 per cent under the first eleven months of 1930.

The November net in the Eastern district was $35,996,369 compared with $40,724,537 in November, 1939, and $28,102,384 in November, 1930.

Class 1 roads in the Southern district for the 11 months had a net of $69,762,612 or 2.42 per cent; for the same period in 1939

it amounted to $70,912,595 or 2.47 per cent, and for the same period in 1930 it was $79,637,041 or 2.63 per cent on investment. Gross in the Southern district for the 11 months amounted to $493,957,752 an increase of 5.8 per cent compared with the same period in 1939, but a decrease of 16.7 per cent under the same period in 1930; operating expenses totaled $370,483,459 an increase of 7.4 per cent above the same period in 1939, but a decrease of 20.5 per cent under 1930.

Class I roads in the Southern district for November had a net of $9,402,080 compared with $8,088,184 in November, 1939, and $6,472,898 in November, 1930.

Class I roads in the Western district for the 11 months had a net of $198,340,799 or 1.96 per cent; for the same period in 1939 their net amounted to $160,381,624 or 1.59 per cent, and for the same period in 1930 it was $324,021,032 or 3.16 per cent. Gross in the Western district for the 11 months amounted to $1,459,138,584 an increase of 4.8 per cent above the same period in 1939, but a decrease of 22.4 per cent below the same period in 1930; operating expenses totaled $1,077,581,044 an increase of 2.3 per cent compared with the same period in 1939, but a decrease of 21.1 per cent under the same period in 1930.

For November alone the roads in the Western district had a net of $25,700,468 compared with $21,601,895 in November, 1939, and $26,600,134 in November, 1930.

CLASS I RAILROADS—UNITED STATES

	1940	1939	1930
Month of November			
Total operating revenues	$375,363,842	$368,026,739	$394,261,533
Total operating expenses	259,454,782	256,170,301	295,812,115
Taxes	34,080,361	30,498,802	25,418,475
Net railway operating income	71,098,917	70,414,616	61,175,416
Operating ratio—per cent	69.12	69.61	75.03
Rate of Return on property investment	3.32	3.29	2.88
Eleven Months Ended November 30			
Total operating revenues	$3,914,808,946	$3,649,823,992	$4,906,580,018
Total operating expenses	2,823,340,009	2,669,203,173	3,636,468,116
Taxes	374,740,170	331,450,857	328,645,340
Net railway operating income	598,201,070	527,847,779	820,214,052
Operating ratio—per cent	72.12	73.13	74.11
Rate of Return on property investment	2.46	2.18	3.38

Carriers Seek Blanket Fourth Section Relief

Acting on the recent recommendations of the Association of American Railroads' Committee on Freight Tariffs the A. A. R. and the American Short Line Railroad Association have filed with the Interstate Commerce Commission a petition for blanket relief from the long-and-short haul clause in order to simplify the publication of tariffs to cover situations where the departures are caused by circuitous rail and rail-water routes rather than by competing water lines.

Generally speaking, the application might be described as an appeal for more practicable and sensible administration of the fourth section. Under it applicants "seek authority to establish and maintain between any two points, via any available all-rail or rail-and-water route, the same rate or charge that is currently in effect via another all-rail or rail-and-water route, without observing the long-and-short haul provision of section 4(1) of the Act." Also, it is pointed out that the application relates to all rates, class or commodity, participated in by any of the railroads, including rates applicable between points in the United States on foreign commerce.

Effects of the proposed relief would be to relieve the railroads from the burden of costly tariff work and the preparation of circuity tables and the ascertainment of whether or not particular rates are "reasonably compensatory" within the meaning of the Act.

The petition lists the following "principal items of expense and annoyance" which result from the commission's present practice of handling these fourth section cases:

1. The expense to the railroads of preparing and presenting testimony at individual hearings in which most shippers evince little or no interest.

2. Extensive rate checks and the publication of an immense amount of detailed routing instructions to give effect to circuity limitations usually embodied in fourth section orders.

3. The difficulty of effecting tariff simplification because of the publication of an immense amount of detailed routing.

4. The bringing about of many "unwarranted" rate reductions resulting in the depletion of carriers' revenues because of the reduction in intermediate rates to avoid departure from the long-and-short-haul rule due to the "delay and uncertainty involved in securing fourth section relief."

5. The fact that the circuity limitations, coupled with the "not uncommon" additional conditions with respect to minimum ton-miles or car-mile earnings and minimum percentages of specified class rates, frequently result in closing a route to some traffic while leaving it open to other traffic.

November Truck Loadings Up 15 Per Cent Over Last Year

Reflecting a seasonal decline of 5.9 per cent under October, the November truck loadings were nevertheless 15.2 per cent above the volume handled in November, 1939, according to the American Trucking Associations. The A. T. A. index number, based on the 1936 monthly average of reporting carriers as 100, stood at 139.33 for November.

Comparable reports were received by A. T. A. from 241 motor carriers in 40 states. The reporting carriers transported an aggregate of 1,533,639 tons in November, as against 1,629,678 tons in October and 1,331,013 tons in November, 1939. Approximately 75 per cent of all the freight transported during the month by the reporting carriers was "general merchandise." The volume of freight in this category decreased 6.9 per cent under October, but represented an increase of 14.9 per cent over November of the previous year. Transporters of petroleum products, accounting for slightly less than nine per cent of the total tonnage reported, showed a decrease of 5.7 per cent in November, as compared with October, but their volume increased 14.5 per cent over November, 1939. Movement of new automobiles and trucks, constituting a little more than six per cent of the total tonnage, increased 19.5 per cent over October, and 19.2 per cent over November, 1939. The increase over October was attributed to continued heavy movement of 1941 models. Iron and steel products represented about three per cent of the total reported tonnage. The volume of these commodities decreased 13.9 per cent under October, but represented a 19.6 per cent increase over November of last year.

Almost six per cent of the total tonnage reported was miscellaneous commodities, including tobacco, textile products, bottles, building materials, coal, cement and household goods. Tonnage in this class decreased 11.6 per cent under October, but held 13.5 per cent over the volume hauled in November, 1939.

Philly Passenger Men Hold 25th Anniversary Dinner

The Philadelphia Passenger Association will hold its 25th annual banquet at the Bellevue-Stratford hotel, Philadelphia, Pa., on January 6, in connection with its silver jubilee anniversary. Col. J. C. King, of the first military area, will be the chief speaker on the subject "Railroads, the Vanguard of Civilization," in which he is expected to discuss the railroads also from the standpoint of national defense.

Club Meeting

The Eastern Car Foremen's Association will hold its next meeting on January 10 at the Engineering Societies building, 29 West 39th street, New York, at 8 p. m. A. J. Ferentz, foreman car department, Central of New Jersey, Jersey City, N. J., will discuss A. A. R. Rules of Interchange.

Equipment Depreciation Orders

Equipment depreciation rates for the Chattahoochee Valley, Gulf & Northern, Gulf & Ship Island and Railway Transfer of Minneapolis have been prescribed by the Interstate Commerce Commission in a new series of sub-orders and modifications of previous sub-orders in No. 15100, Depreciation Charges of Steam Railroad Companies.

Old Congress Gives Way to New

The third and final session of the Seventy-sixth Congress, which made transportation history with the passage of the Transportation Act of 1940, came to an end this week. After continuing for more than a year it gave way to the new Seventy-seventh Congress which convened on January 3.

The session's work in the field of transportation legislation was reviewed in the *Railway Age* of October 19, 1940, page 551, while the no-business-until-after-election schedule was in effect. Only one rail-

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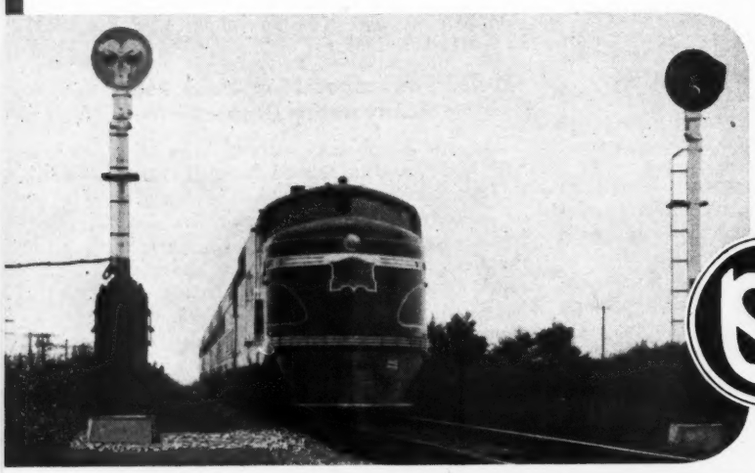
THE ADVANTAGES OF SIGNAL SYSTEMS ARE REFLECTED IN OPERATING STATISTICS

WHILE signals were originally installed for safety purposes, and this fundamental principle has never been sacrificed, today they are equally important in facilitating train movements, and their advantages are clearly reflected in operating statistics. How various signal systems have aided in getting trains over the road in less time and at less cost is indicated by the following facts:



AUTOMATIC BLOCK SIGNALS

THE increased safety of train operation and the operating benefits gained account for the steady increase in track mileage of automatic block signals. On twelve installations, the freight train hours saved per year ranged from 2,579 to 13,399, with from 42.0 to 157.1 track miles operated; the freight train speed increase ranged from 9 to 55 per cent, while the time saved per train ranged from 18 minutes to 4 hours and 32 minutes. In one instance the overtime hours were reduced 92 per cent. These 12 installations show an average annual return of 26.9 per cent and an average increase of train speed of 20.5 per cent. The actual dollar savings are substantial.

CENTRALIZED TRAFFIC CONTROL

C.T.C. IS ONE of the most important developments in railway signaling in that it combines all of the functions of control over traffic into a centralized system, permitting train operation by signal indication without the use of written train orders and without superiority of trains. C.T.C. practically eliminates the time element in the transmission of orders and results in more efficient dispatching. C.T.C. has postponed second tracking; made possible the handling of additional tonnage; reduced average freight running time; reduced operating costs and permitted reverting from double to single track operation. C. T. C. is a quickly self-liquidating investment.

UNION SWITCH & SIGNAL COMPANY

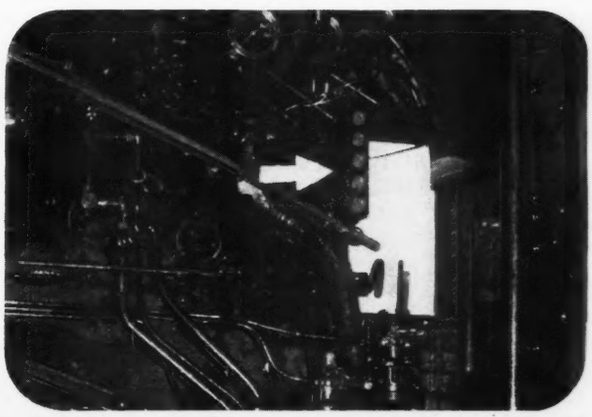
DISTRICT OFFICES

INTERLOCKING

WITH its facility for eliminating train stops, interlocking is an economic means of reducing operating expenses and expediting traffic. In 9 installations of interlocking the return ranged from 21.8 to 94.5 per cent per year. On one installation, with only thirty trains per day, 6,000 train stops were saved per year; on another, with 93 trains per day, 29,400 train stops were eliminated; while on a third, with 27 trains per day, over 20,000 train stops were eliminated. The Union Switch & Signal Company is in a position to furnish all types and systems of interlocking to meet every operating requirement.

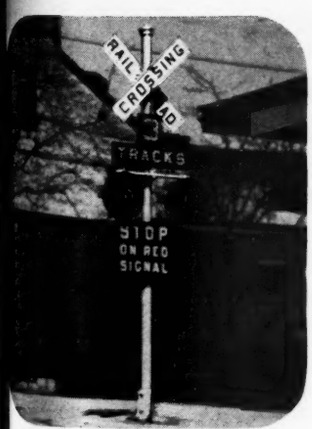
CAR RETARDERS

IN addition to their economic advantages, Car Retarders make it possible to keep classification yards in operation at all times. Damage and injury to lading, equipment and personnel is reduced. Car Retarders permit receiving yards to be cleared quickly, resulting in increased capacity. They increase car miles per day and reduce per diem charges. A study of 21 installations shows that Car Retarders have improved the service to shippers and have reduced operating expenses. Installation of "Union" Electro-Pneumatic Car Retarders will produce substantial operating and economic advantages.



CONTINUOUS CAB SIGNAL SYSTEM

CONTINUOUS Cab Signals remove the handicaps under which enginemen operate in maintaining schedules through fog, storms, smoke and other adverse conditions. This system provides a signal that the engineman may always see. The cab signal instantly shows any change in conditions ahead regardless of the location of the train with respect to wayside signals. Maximum protection is provided in the hazardous situation which may arise when traffic conditions in advance become more restrictive after a train has passed a wayside signal location. By the same token, when a less restrictive indication is received, an engineman may increase the speed of his train. Many operating advantages are obtained by installing the Union Continuous Cab Signal System.



Highway Crossing Protection

Automatic Interlocking

Other modern signal systems, such as Highway Crossing Protection, Coded Track Circuit Control, Automatic Interlockings and Remote Control, offer additional opportunities for savings. Consider the installation of "Union" modern signal systems to secure those additional operating and economic advantages that will be favorably reflected in your future operating reports and statistics.

SWISSVALE, PENNA.

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road bill has since been passed—the so-called "deficit bill" to adjust the basis for settlements of certain short-line claims growing out of the federal control period. It had not been acted upon by the President when this issue went to press. Previously the President had vetoed the Walter-Logan bill which would have provided for judicial review of the rules and decisions of administrative agencies; although the Interstate Commerce Commission, National Mediation Board, National Railroad Adjustment Board and Railroad Retirement Board would have been exempt.

In the main the transportation activities of the legislators in the post-election period of the long session have been the publication of a number of additional reports from Senator Wheeler's sub-committee which investigated railroad finances, and occasional extensions of remarks appearing in appendices to the Congressional Record. Many of the latter had to do with the proposed St. Lawrence seaway and power development which the President is promoting as a "national defense" project.

Meanwhile, as noted in the aforementioned issue of October 19, the session was notable for transportation legislation enacted—even aside from the Transportation Act of 1940. Among the more important of other measures was the so-called bridge bill, passed over President Roosevelt's veto; it provides relief for railroads with respect to the cost of reconstructing bridges required to be altered in connection with waterway improvements made by the federal government. Also, the liberalizing amendments to the Railroad Unemployment Insurance Act. Many other bills of more or less interest to railroaders were passed, while still more were left pending to die with the session.

Highway and Grade Crossing Funds Apportioned

Federal Works Administrator John M. Carmody has apportioned among the 48 States, the District of Columbia, Hawaii and Puerto Rico, $134,062,500 as Federal aid for highway improvement and elimination of hazards at railroad grade crossings. The funds are available from appropriations authorized for the fiscal year beginning July 1, 1941, after deductions of administrative expenses and are to be expended under the supervision of the Public Roads Administration.

The apportionment was authorized by the Act of September 5, 1940, which provided $100,000,000 for improvement of the Federal-aid system and its extensions through cities, $17,500,000 for improvement of secondary or feeder roads, and $20,000,000 for elimination of hazards at railroad grade crossings.

In making the apportionment, Mr. Carmody directed attention to the provision of the act that "the Commissioner of Public Roads may give priority of approval to and expedite the construction of projects that are recommended by the appropriate Federal defense agency as important to the national defense."

All States are being urged to use Federal-aid funds to the full extent possible for roads giving access to the numerous new and expanded Army and Navy bases, camps and training areas and to plants of defense industries, Mr. Carmody said, adding that such work is of an immediate and urgent nature.

"We are already faced with serious congestion in the Hampton Roads area, at San Diego and at numerous other points," he said. "At some camps the call is to get traffic out of the mud on main supply routes. This work is of first importance. Next in importance is the elimination of weak bridges and narrow roadways and strengthening of weak surfaces on the strategic system recommended by defense agencies. These roads are on the Federal-aid system and the improvements needed are the kind we are making in the regular Federal-aid program. The States should plan Federal-aid programs giving first priority to access roads to camps and defense plants and second priority to work on the strategic system."

The highway funds were apportioned among the States in proportion to population, area, and mileage of rural post roads. Grade crossings funds were apportioned, one-half on the basis of population, one-fourth on the basis of mileage of the Federal-aid system, and one-fourth according to railroad mileage. It is provided that no State shall receive less than one-half of one per cent of the total funds.

Expenditure will be under the supervision of the Public Roads Administration of the Federal Works Agency and in accordance with the Federal-aid plan that has been in operation since 1916. The initiative in selection of projects rests with the State highway departments which also prepare plans, let contracts, and supervise construction, all subject to Federal approval.

Mr. Carmody also announced the apportionment of $1,500,000 to be expended in the 13 public lands States for construction of roads through public lands and Federal reservations.

The apportionment of grade crossing funds follows:

State	Grade Crossings
Alabama	$406,480
Arizona	129,679
Arkansas	336,619
California	799,099
Colorado	252,705
Connecticut	164,330
Delaware	97,500
Florida	299,547
Georgia	488,535
Idaho	167,025
Illinois	1,011,900
Indiana	501,817
Iowa	538,808
Kansas	487,825
Kentucky	357,973
Louisiana	318,101
Maine	133,657
Maryland	204,759
Massachusetts	387,602
Michigan	651,077
Minnesota	525,569
Mississippi	314,017
Missouri	580,174
Montana	262,484
Nebraska	335,670
Nevada	97,500
New Hampshire	97,500
New Jersey	376,651
New Mexico	170,673
New York	1,330,049
North Carolina	515,538
North Dakota	300,388
Ohio	818,286
Oklahoma	439,081
Oregon	228,715
Pennsylvania	1,091,120
Rhode Island	97,500
South Carolina	297,944
South Dakota	260,078
Tennessee	381,156
Texas	1,096,857
Utah	129,466
Vermont	97,500
Virginia	375,157
Washington	304,376
West Virginia	264,524
Wisconsin	484,129
Wyoming	131,610
Hawaii	97,500
Dist. of Col.	97,500
Puerto Rico	166,250
Total	$19,500,000

Freight Car Loading

The freight car loadings figures for the week ended December 28 were not available at the time this issue of the *Railway Age* went to press.

Loadings of revenue freight for the week ended December 21 totaled 700,242 cars. This was a decrease of 36,090 cars or 4.9 per cent below the preceding week, but an increase of 48,850 cars or 7.5 per cent above the corresponding week in 1939, and an increase of 126,044 cars or 22 per cent above the comparable week in 1938. The summary for that week, as compiled by the Car Service Division, A. A. R., follows:

Revenue Freight Car Loading

For Week Ended Saturday, December 21			
Districts	1940	1939	1938
Eastern	156,259	147,514	125,852
Allegheny	154,379	140,882	107,825
Pocahontas	44,417	43,886	42,035
Southern	109,010	99,360	90,508
Northwestern	81,434	74,571	68,963
Central Western	106,371	97,928	94,644
Southwestern	48,372	47,251	44,371
Total Western Districts	236,177	219,750	207,978
Total All Roads	700,242	651,392	574,198
Commodities:			
Grain and grain products	28,047	32,702	30,725
Live stock	11,843	11,416	11,997
Coal	148,577	138,736	133,490
Coke	12,795	12,083	6,636
Forest products	37,778	31,711	27,614
Ore	12,852	11,811	9,001
Merchandise, l.c.l.	149,032	144,518	140,909
Miscellaneous	299,318	268,415	213,826
Dec. 21	700,242	651,392	574,198
Dec. 14	736,332	678,132	606,003
Dec. 7	738,513	683,973	618,964
Nov. 30	728,525	685,496	648,534
Nov. 23	733,488	673,113	561,658
Cumulative Total, 51 Weeks	35,810,789	33,363,434	29,957,623

Expect First-Quarter Loadings to Be Up 9.5 Per Cent

Freight car loadings in the first quarter of 1941 are expected to be about 9.5 per cent above actual loadings in the same quarter in 1940, according to estimates compiled by the 13 Shippers' Advisory Boards. On the basis of those estimates, freight car loadings of the 29 principal commodities will be 5,572,106 cars in the first quarter of 1941, compared with 5,089,820 actual car loadings for the same commodities in the corresponding period in the preceding year. All of the 13 Shippers' Advisory Boards estimate an increase in carloadings for the first quarter of 1941 compared with the same period in 1940.

Administrator Promulgates Minimum Wage Order

Wage rate increases totaling more than $7,000,000 for some 70,000 railroad track workers, red caps, dining car waiters, office and other employees will become effective March 1, Colonel Philip B. Fleming, Administrator of the Wage and Hour

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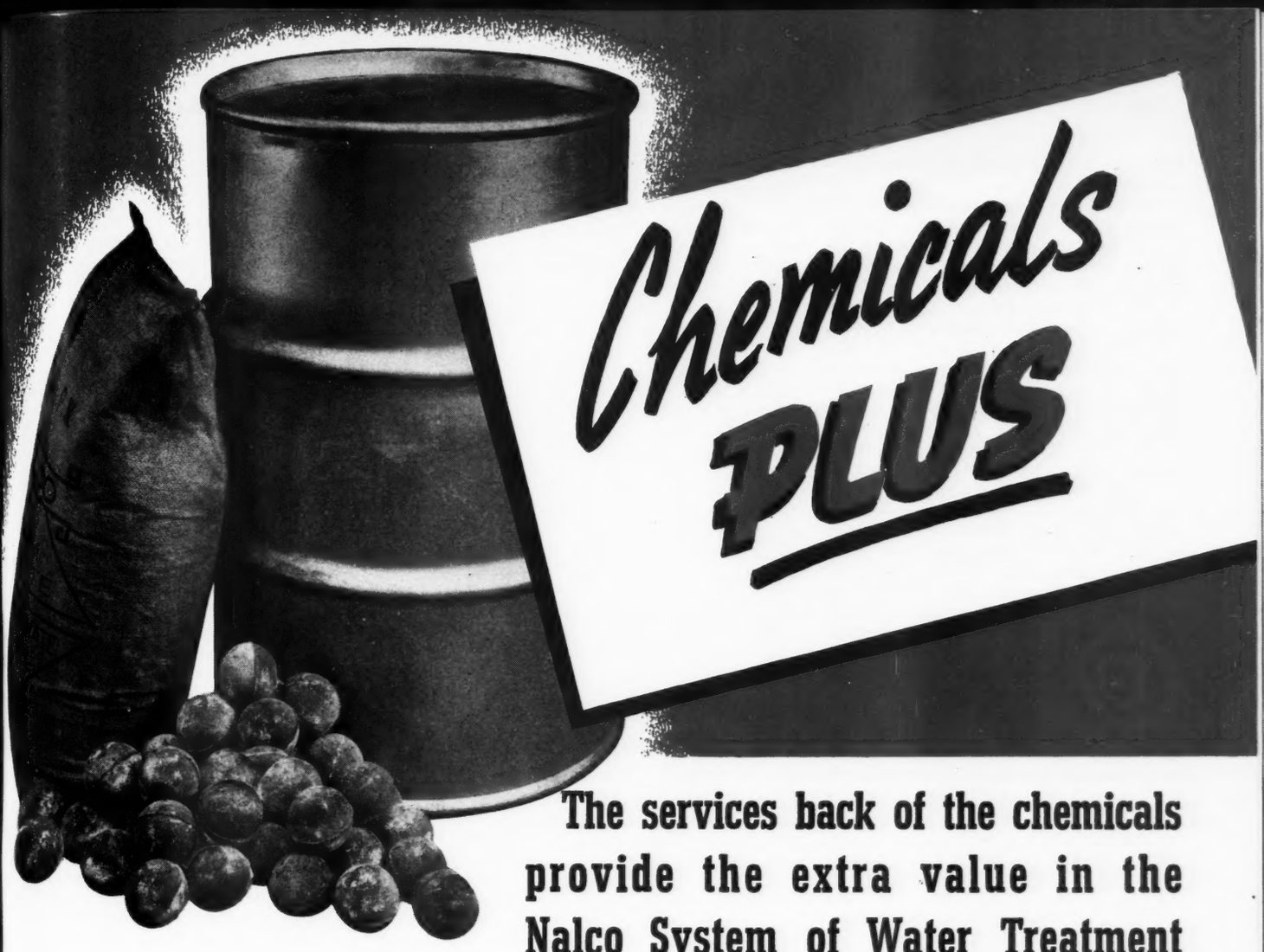

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NALCO SYSTEM
OF WATER TREATMENT

Division, U. S. Department of Labor, announced on January 2.

The wage increase was ordered in approving a recommendation by the railroad carrier industry committee, appointed under the Fair Labor Standards Act. After an extensive investigation of wages paid by American railroads, the committee under the chairmanship of Frank P. Graham, president of the University of North Carolina, recommended establishment of a minimum wage of 36 cents an hour for employees of trunk line railroads and 33 cents for short lines.

"About 65,000 of the one million or more persons employed by the trunk line railroads and the Pullman Company, the Railway Express Agency, car loan companies and terminal companies will receive a wage increase under the 36 cent minimum," Colonel Fleming said. "Some 5,000 of the 21,000 employees of the short lines will be affected by the 33 cent minimum rate. As carloadings are rising, the number of workers who will receive wage increases on March 1 is probably larger than these figures which are on the basis of studies made in 1939."

Railroads principally affected by the wage order on the basis of 1939 studies made by the railroads are: The Seaboard Air Line will increase annually the wages of its lowest paid employees by $688,000; the Atlantic Coast Line by $611,000; the Illinois Central (including the Yazoo & Mississippi Valley) by $443,000; the Texas and New Orleans by $415,000; the Southern Railway by $412,000; the Missouri Pacific by $385,000; the Central of Georgia by $212,000; the Southern Pacific by $165,000; the Louisville & Nashville by $136,000; the Florida East Coast by $127,000; the Louisiana & Arkansas by $126,000; the Chicago, Rock Island & Pacific by $126,000 and the International-Great Northern by $109,000.

Other roads which will have to increase the wage rate of considerable numbers of their employees are: The Missouri-Kansas-Texas by $96,000; the Texas & Pacific by $93,000; the Gulf Coast Lines by $91,000; the Atchison, Topeka & Santa Fe by $81,000; the St. Louis-San Francisco by $54,000; the Nashville, Chattanooga and St. Louis by $45,000 and the St. Louis Southwestern by $28,000.

According to figures submitted by the railroads, 26,000 of those employed at less than 36 cents an hour were employees of railroads classified as "western lines"; 24,000 employed by "southern lines"; and 6,000 employed by "eastern lines."

The types of railroad workers who will receive the wage increase are indicated by the following table:

Clerical and Station Forces	
Telephone Switchboard Operators and Office Assistants	976
Messengers and Office Boys	2,148
Janitors and Cleaners	970
Baggage, Parcel Room and Station Attendants	570
Truckers (Stations, Warehouses and Platforms)	1,843
Common Laborers (Station, Warehouses, Platforms and Grain Elevators)	804
Miscellaneous Employees Under Clerical and Station Forces	501
Maintenance of Way Group	
Pumping Equipment Operators	485
Extra Gang Men	5,632
Sectionmen	21,728
Maintenance of Way Laborers (other than Extra Gang Men) Gardeners and Farmers	908
Crossing and Bridge Flagmen and Gatemen	6,928
Miscellaneous Maintenance of Way Group	522
Shop Craft Group	
Coach Cleaners	785
Shop Laborer Group	
Classified Laborers (Shops, Enginehouses and Power Plants)	1,838
General Laborers (Shops, Enginehouses and Power Plants)	2,649
General Laborers (Stores and Ice, Reclamation and Timber Treating Plants)	742
Dining Buffet, etc., Car Group	
Waiters (Restaurants or Dining Cars)	4,324
Kitchen Helpers (Restaurants or Dining Cars)	567
Miscellaneous Dining, Buffet, etc., Car Group	706
Police Department Group	
Watchmen	179
Switching and Terminal Company Employees	2,534
Railway Express Agency Employees	762
Pullman Company Employees	438
Car Loan Companies Employees	724
Employees of Electric Railroads Which Are a Part of the Steam Railroad System	371
Red Caps	3,306
Short Line Railroad Employees (33 cent minimum)	5,300

Why I.C.C. Blocked Big Truck Merger

(*Continued from page 120*)

plications covering the financing of the proposed acquisitions. With respect to the latter the commission said: "The total consideration ($22,543,656) is approximately 2.12 times the tangible property valuation . . ., 11.27 times the aggregate book net income for 1939, and 8.81 times the adjusted net income for that year. It is 24.62 times average annual net income for the years 1937, 1938, and 1939." Previously the report had noted that the promoters of the enterprise included Kuhn, Loeb & Company, B. M. Seymour, Transport's president, Charles E. Cotterill, Mark Potter, C. B. Wiggin and the Wilmington, Del., firms of Laird & Company and Laird, Bissell & Company. For services as organizers they would receive the right to purchase for $100,000 a restricted common stock which the commission estimated would be worth $2,200,000.

"We have," the report went on, "generally accepted as not unreasonable considerations agreed upon by the contracting parties, unless they appeared to be extravagant or it seemed likely that payment thereof would unduly burden the purchasing carrier. . . . Cases involving unifications, or acquisitions of control, of motor carriers which heretofore have come before us, have concerned transactions involving bargaining between carriers, or persons controlling such carriers. The result of arms-length bargaining is entitled to weight when considering the reasonableness of a proposed transaction. The instant transactions are quite distinguishable in this respect. In a project carried forward by promoters and bankers, the restraining influence of a person spending his own money is not present. Commissions of promoters are usually based upon a percentage of the purchase price and the profits of bankers upon the amount of securities sold. The higher the prices paid to sellers of the properties being purchased, the greater the profit of all concerned—except the purchasers of the securities of the new company." Here a footnote stated that under the transactions as originally presented, the organizers' commissions were based on the purchase prices, the plan for the issuance of the aforementioned restricted common stock having been formulated after service of the examiner's report. One of the conditions suggested by Mr. Davey was that the organizers limit their compensation to 10 per cent of the applicant's stock.

Just before setting forth five specific findings on the financial aspects of the case, the commission had this to say: "We believe that unifications of motor carriers are more likely to be on a sound basis, and the prospects of ultimate success improved, if they be brought about through the initiative, and negotiations between the carriers involved, or between persons financially interested in such carriers who retain a substantial interest in the enterprise, without the use of holding company devices or the intervention of promoters, particularly where such intervention would substantially increase ultimate costs."

Meanwhile the commission had discussed other phases of the case, including the effect of the proposed transactions in general, the dual operations, the matter of competition and the employment agreements. In the first connection, "the testimony with respect to proposed economies and improvements in service is not convincing." Next, "in the present proceeding there has been no 'good cause shown' as a basis for a finding that such dual operations would be consistent with the public interest under the conditions here proposed." With respect to competition it appeared to the commission that if the transactions were consummated "there would remain substantial motor-carrier competition between most cities in the New England and Middle Atlantic regions, but we are left in doubt as to whether adequate motor-carrier competition would remain on traffic moving between the Southern region and points north of Baltimore."

The employment agreements were the 58 contracts whereby Transport agreed to retain the principal officers of the companies it was acquiring. The commission said that such contracts with an average term of 4.4 years and a maximum of 10 years provided for an aggregate annual compensation of $685,550. It added that the making of employment agreements "to such an extent as in this proceedings premised upon a unification, is not in the best interests of the industry and the public."

Aside from its adverse action on the application for authority to issue securities to finance the proposed merger, the commission's general conclusions were that the applications to acquire the carriers among the companies involved should be denied, while the applications to acquire the non-carrier companies are not within the scope of the Interstate Commerce Act's consolidation provisions and should be dismissed.

In his concurring-in-part opinion Chairman Eastman regarded it "unfortunate that in this case, full of new questions of great importance to the development of the motor carrier industry, the circumstances were such as to require quick decision without oral argument before the commission." Because some of the questions presented

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"are by no means one-sided," he was not in "entire agreement with the discussion and conclusions" in the majority report.

The chairman thought that creation of a motor carrier unit of the size contemplated would open opportunities for operating economies; and he would like to see the experiment tried. He does not share the majority's doubt with respect to the adequacy of the competition on traffic moving between the Southern region and points north of Baltimore. And while his record as "a public critic of holding companies goes back to 1908," Mr. Eastman thinks that nevertheless "there is a useful function which holding companies can at times perform, under proper public control." In the latter connection, the I. C. C. chairman went on to recall how he has had occasion to consider "what would be the best form of organization if, perchance, it became necessary for the government to own and operate the railroads." He added that one means of avoiding the dangers of centralization and bureaucracy would be to employ the holding-company plan of organization, "permitting the creation of separate companies to own and operate the several parts of the railroad system with a parent company to own all of their stocks, the stock of the parent company being owned in turn by the government." The American Telephone & Telegraph Company and the Greyhound Corporation, Mr. Eastman pointed out, have followed a similar plan of organization "with much apparent success."

He was, therefore, not prepared to condemn Transport's plan because it provided for a holding company; but he did agree that the set-up should be simplified by the consolidation of a considerable number of the subsidiaries. Like the majority, Mr. Eastman found the proposed unification's "most objectionable features" in its financial phases. In his opinion the vendors were too insistent upon receiving payment in cash; it seemed to him that if the plans worked out according to intent, the investing public would be "left holding most of the bag." If the vendors have faith in the enterprise, Mr. Eastman thinks they should be willing to take less cash and more of Transport's common stock as payment for their present holdings.

Moreover, the plan for compensating the organizers impressed Mr. Eastman as being "quite disingenuous." As he figured it out, it was "a shrewd device for ensuring the desired compensation for promoters and bankers without bringing it under our supervision." Explaining this further the I. C. C. chairman pointed out that the restricted common stock, being of a total par value less than $500,000, could be lawfully issued without I. C. C. approval. He added that the actual value of that $1-par stock would, however, be at least $20 per share.

Commissioner Alldredge agreed with the final results of the majority decision, but he could not accept "without reservation" all of the discussion and conclusions. In his judgment there were two "fundamental" reasons for rejecting the proposed plan—the financial transactions involved and the resulting capitalization of the new company.

Supply Trade

George L. Cotter has been appointed commercial engineer for the **Westinghouse Air Brake Company,** with headquarters at the general office in Wilmerding, Pa. He entered the employ of the company as a special apprentice in 1923, immediately after his graduation from the University of Michigan. For two years he was engaged in test and development work in the engineering department and was transferred to the commercial engineering department in 1925. He was advanced to district engineer for the Pittsburgh district in 1929, and held this position until his recent promotion. Mr. Cotter will now have supervision of the commercial engineering division.

John L. Hoffman has been appointed sales representative for **The Oxweld Railroad Service Company** in Southeastern territory, succeeding **W. M. Leighton,** who retired effective December 31. Mr. Hoffman has been actively engaged in the promotion of oxy-acetylene welding and cutting for twenty-two years. He started in business with Taylor-Wharton Iron & Steel Co., later joining the Central of New Jersey at its Elizabethport (N. J.) shops, working on welding projects in connection with locomotives. In 1922 he took a position as welding instructor with The Oxweld Railroad Service Company, Mechanical department, and worked for this company on a number of railroads in New England. He was made district superintendent for the New England territory in 1926 and had under his charge the mechanical and maintenance-of-way department's welding activities and instructors. Since 1936 he has been assistant general superintendent, with headquarters in Chicago.

John L. Hoffman

OBITUARY

George E. Haas, manager of the turbine and headlight department of the Pyle National Company, Chicago, died in that city on December 25 of a complication of ailments.

Financial

BALTIMORE & OHIO-NEW YORK CENTRAL-PENNSYLVANIA.—*Bonds, Stocks, and Acquisition by the Dayton Union.*—The Dayton Union has been authorized by Division 4 of the Interstate Commerce Commission to issue and dispose of 10,590 shares of its capital stock and $3,900,000 of its general mortgage bonds. Series A bonds in the amount of $1,500,000 will be dated December 1, 1940, and will mature in the amount of $150,000 on December 1 of each of the years from 1941 to 1950, inclusive. The $2,400,000 of series B bonds will be dated December 1, 1940, and will mature December 1, 1965. The series A bonds will have varying rates of interest, while the series B bonds will carry 3¼ per cent. At the same time the Dayton Union was authorized to acquire slightly over four miles of track in Dayton, Ohio, now owned by the Baltimore & Ohio, the New York Central and the Pennsylvania. The new financing will be used to pay for the acquisition of property from the three lines. Division 4 also authorized the three proprietary systems to assume liability jointly and severally as guarantors of the general mortgage bonds.

CHICAGO GREAT WESTERN.—*Reorganization.*—To expedite the reorganization of this company under the Interstate Commerce Commission's final plan, Division 4 has authorized the debtor company, the Chicago Great Western Railroad, to acquire the properties of the Leavenworth Terminal Railway & Bridge Company and the Mason City & Fort Dodge, both wholly-owned subsidiaries of the debtor. These properties will then be transferred to the new company, the Chicago Great Western Railway, together with the properties of the old company when reorganization is completed.

SOUTHERN PACIFIC.—*Acquisition of the Waco, Beaumont, Trinity & Sabine.*—This company has asked the Interstate Commerce Commission to deny the recent petition of the Waco, Beaumont, Trinity & Sabine requesting the commission to amend its order authorizing the Southern Pacific to acquire control of the St. Louis Southwestern by requiring the Southern Pacific to take over and acquire, under suitable guarantees as to title and freedom from debt, at a reasonable price, the line of the Waco company extending from Weldon, Tex., to Livingston, 41.6 miles.

In the event that the commission does not see fit to deny the petition of the Waco company, the Southern Pacific asks that the commission find that it should not acquire the line and so amend its order authorizing control of the Cotton Belt. In its petition the Southern Pacific points out that because of the fact that the Cotton Belt is in reorganization and is being operated by a trustee, it no longer exercises any control over the road.

YOSEMITE VALLEY.—*Reorganization.*—Finding that the equity of the present stockholders has no value, Division 4 of the Interstate Commerce Commission has approved a final plan of reorganization for

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this company under section 77 of the Bankruptcy Act which provides for a new capitalization of $1,159,000 of new four per cent income bonds, and 25,000 shares of new common stock, of $50 par value, together with the unpaid portion of a rehabilitation loan, amounting to $24,761. As of December 31, 1939, the capitalization of the company was represented by 1,761 shares of common stock, $2,318,000 of matured first mortgage five per cent bonds, with accumulated unpaid interest of $760,175, and a rehabilitation loan of $24,761, payable serially to the extent earnings were available. Interest on the old bonds constituted a fixed charge of $115,900 a year. Under the final plan the holder of each $1,000 bond now outstanding will receive, in exchange therefor, $500 of the new income mortgage four per cent bonds, together with 10 shares of the new common stock, and a pro rata share of the cash in the possession of the company or its trustee, at the time of the consummation of the plan, less the remaining reorganization expenses, the amount due on the rehabilitation loan, and $50,000 to be reserved for working capital. The effective date of the plan will be April 1, 1940.

Construction

ATLANTIC COAST LINE.—This company has asked the Interstate Commerce Commission in Finance Docket No. 11709 to extend from January 1, 1941, and March 31, 1941, to January 1, 1942, and March 1, 1942, the time within which it may commence and complete the construction of a line in Columbus County, N. C.

CANADIAN NATIONAL.—A contract has been awarded G. A. Baert, St. Boniface, Man., for the construction of a 300-ton capacity coal chute which will serve two engine tracks on 50-ft. centers. The new coal chute will replace a structure of the ramp type and will be of heavy timber construction, supported on concrete foundations resting, in turn, on timber piles. The coal will be unloaded into a track hopper and elevated to the storage bin by an endless chain bucket elevator, which will be driven by a 15-hp. electric motor.

CENTRAL AROOSTOOK.—This company has asked the Interstate Commerce Commission in Finance Docket No. 4092 to extend to December 31, 1942, the time within which it may complete the construction of a line in Aroostook County, Me.

CHESAPEAKE & OHIO.—Division 4 of the Interstate Commerce Commission has extended from December 31, 1940, to December 31, 1942, the time within which this company may complete the construction of a new line in Boone County, W. Va. The proceeding is listed as Finance Docket No. 11917.

UNION PACIFIC.—A contract has been awarded E. H. Schraven, Salt Lake City, Utah, for the construction of a one-story brick passenger and freight station 121 ft. 6 in. long by 26 ft. wide at Nyssa, Ore.

Railway Officers

EXECUTIVE

S. C. Kirkpatrick, assistant to the general manager of the Gulf, Colorado & Santa Fe, with headquarters at Galveston, Tex., has been promoted to assistant to the vice-president, with headquarters at Chicago, succeeding **T. A. Gregg,** who retired on January 1.

C. W. Van Horn has been elected vice-president, operation and maintenance, Baltimore & Ohio, with headquarters at Baltimore, Md., as reported in the *Railway Age* of December 21. Mr. Van Horn was born at Clarksburg, W. Va., on January 17, 1879, and was educated in the public schools and at Salem College. He entered railroad service with the Baltimore & Ohio as clerk at Fairmont, W. Va., in June, 1901. He then became agent successively at Byron, Flemington and Clarksburg, W. Va., and was appointed general yardmaster at Clarksburg, in October, 1910. Mr. Van Horn was promoted to chief clerk to the general superintendent at Baltimore on April 1, 1911, and a few months later became trainmaster of the Monongah division at Clarksburg. He was then transferred to Chicago, and later served as terminal trainmaster at Chicago Junction (now Willard), Ohio. On April 1, 1916, he was promoted to assistant superintendent of the Pittsburgh division and on January 10, 1917, was promoted to superintendent of the New Castle division, being transferred to the Monongah division on September 1, 1918, and to the Cumberland division two years later. He was appointed general superintendent of the Maryland district at Baltimore on June 1, 1923, and general

C. W. Van Horn

superintendent of transportation on January 19, 1926. Mr. Van Horn was appointed general manager of the Western Lines of the Baltimore & Ohio on June 15, 1929, at Cincinnati, Ohio, and was transferred to the Eastern Lines on May 1, 1932, the position he held until his recent appointment.

Frank G. Cronin, whose promotion to assistant vice-president in charge of traffic of the Chicago, Indianapolis & Louisville (Monon), with headquarters at Chicago, was announced in the *Railway Age* of December 21, was born at Indianapolis, Ind., on September 30, 1880, and took various stenographic, accounting and traffic courses. He entered railway service in

Frank G. Cronin

July, 1900, in the local freight office of the Pennsylvania at Indianapolis, serving as bill clerk and rate clerk for that road and the Cleveland, Cincinnati, Chicago & St. Louis (Big Four) until 1905, when he became secretary to the general manager of the Indianapolis Brewing Company. From 1908 to 1913, he served the Belt Railroad and Stock Yards Company of Indianapolis as an accountant, switchman and chief clerk to the superintendent. In April, 1913, Mr. Cronin became chief clerk and solicitor on the Monon at Indianapolis, and during the first World War he was furloughed to the Railroad Administration, Accounting division, Washington, D. C., as a transportation accountant, returning to the Monon in December, 1920, as freight agent at West Baden, Ind. A year later he was appointed traveling freight agent at Louisville, Ky., and in June, 1926, he was promoted to commercial agent at Chicago. Mr. Cronin was advanced to general agent at Cincinnati, Ohio, in January, 1929, and to division freight agent at Chicago in April, 1932, holding the latter position until his recent promotion.

OPERATING

W. A. Jackson, joint superintendent telegraph of the New York Central, with headquarters at Detroit, Mich., has been appointed general superintendent, telegraph and telephone, with headquarters at New York, effective January 1, succeeding **A. J. Kohne,** who retired on December 31, 1940, after more than 47 years of service with the company. **S. L. Van Akin** has been appointed joint superintendent telegraph at Detroit. **C. E. Baxter** has been appointed joint assistant superintendent telegraph, with headquarters at Syracuse, N. Y.

W. Wicker, assistant superintendent on the Missouri Pacific, with headquarters at McGehee, Ark., has been promoted to superintendent of the Union Railway Company (controlled by the Missouri Pacific),

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with headquarters at Memphis, Tenn., succeeding **W. C. Rapp**, who has been assigned to other duties. **F. E. Bromley**, trainmaster on the Missouri Pacific at Jefferson City, Mo., has been promoted to assistant superintendent at McGehee, relieving Mr. Wicker, and **B. W. Smith** has been appointed trainmaster at Jefferson City, replacing Mr. Bromley. **J. F. Serrett**, acting trainmaster, has been appointed trainmaster at Wynne, Ark., and **J. C. King**, assistant trainmaster, has been advanced to trainmaster at Ferriday, La.

ENGINEERING AND SIGNALING

Henry W. Fenno, engineer maintenance of way on the New York Central lines west of Buffalo and the Ohio Central lines, with headquarters at Cleveland, Ohio, has retired, and **Lynn B. Holt**, engineer of track, with headquarters at Cleveland, has been appointed assistant district engineer, with the same headquarters. The positions of engineer maintenance of way and engineer of track at Cleveland have been abolished.

MECHANICAL

R. N. Booker, district road foreman of engines on the Southern Pacific at Los Angeles, Cal., has been promoted to general air brake inspector and general road foreman of engines, with headquarters at San Francisco, Cal., succeeding **L. S. Ayer**, who retired on January 1.

Paul Thomas, assistant master mechanic of the Philadelphia division of the Pennsylvania, has been appointed master mechanic of the Chicago Terminal and Logansport divisions. **J. F. Hunt**, foreman, Philadelphia division, has been appointed assistant master mechanic, Philadelphia division.

PURCHASES AND STORES

S. C. Welby, assistant general fuel agent of the Canadian National, has been appointed general fuel agent, Montreal, Que., effective January 1, succeeding **George H. Jenkins**, who has retired at his own request after 50 years of service.

TRAFFIC

J. O. Shortall, general agent for the Chicago, Indianapolis & Louisville (Monon), at Minneapolis, Minn., has been promoted to assistant general freight agent, with headquarters at Chicago.

W. E. Norton, chief of tariff bureau, passenger department, Canadian National, with headquarters at Montreal, Que., has assumed charge of the ticket bureau in addition to his tariff duties. **A. E. Storey**, chief of the ticket bureau, has been appointed special passenger representative in the office of the general passenger traffic manager.

Frank A. Bell, assistant general freight agent on the Atchison, Topeka & Santa Fe, at Los Angeles, Cal., has been promoted to general freight agent, a newly created position, with the same headquarters. **F. P. Cruice**, assistant general freight agent at Los Angeles, retired on January 1, and **A. E. McGowan**, chief clerk in the general freight office at that point, has been advanced to assistant general freight agent, succeeding Mr. Cruice.

Walter E. Dobbs, whose promotion to general passenger agent on the Canadian National, with headquarters at Winnipeg, Man., was announced in the *Railway Age*

Walter E. Dobbs

of December 21, entered railway service on the Canadian National in 1904 in the car service department at Montreal, Que. In 1907, he joined the passenger department and in 1910 he was transferred to Winnipeg, where he remained for ten years. From 1920 to 1924, Mr. Dobbs was located in Vancouver, B. C., returning to Montreal on the latter date as office assistant to the general passenger traffic manager. In 1932, he was appointed special passenger representative and has remained in that position until his recent promotion.

Sidney Osborne Scott, whose promotion to passenger traffic manager of the Western region of the Canadian National, with headquarters at Winnipeg, Man., was

Sidney Osborne Scott

announced in the *Railway Age* of December 21, was born in St. Andrews Parish, Man., on July 6, 1881, and attended St. John's College, Winnipeg, and Manitoba University, graduating from the latter in 1901. He entered railway service in 1901 in the audit office of the Canadian Northern (now part of the Canadian National) and in 1903 was placed in charge of the baggage, ticket stock and advertising traffic department at Winnipeg. In 1910, he was appointed traveling passenger agent at Toronto, Ont., and eight months later he returned to Winnipeg as chief clerk in the passenger traffic department. Mr. Scott was promoted to assistant general passenger agent at Winnipeg in 1912, and in 1918 he was advanced to general passenger agent at that point. He was transferred to Vancouver, B. C., in 1920, and back to Winnipeg in 1923.

Robert Creelman, whose retirement on December 18 as passenger traffic manager of the Western region of the Canadian National, with headquarters at Winnipeg, Man., was announced in the *Railway Age* of December 21, was born at Durham, Ont., on December 18, 1875, and entered railway service in August, 1891, as a clerk in the office of the city freight agent of the Grand Trunk (now part of the Canadian National) at Toronto, Ont. He was promoted to ticket clerk at that point in 1892, and to chief clerk to the district passenger

Robert Creelman

agent in 1896. In January, 1900, he was appointed clerk in the general passenger department at Winnipeg, and in 1901 he was appointed rate clerk for the Canadian Northern (now part of the C. N. R.). Mr. Creelman went with the Northern Pacific in 1903 as city ticket agent, and from 1906 to 1909 he served as traveling passenger agent for the Canadian Northern at St. Paul, returning to Winnipeg on the latter date as assistant general passenger agent. In 1911, he was promoted to general passenger agent, and in 1918 to assistant passenger traffic manager at Winnipeg. In March, 1923, Mr. Creelman was advanced to passenger traffic manager of the Western region, the position he held until his retirement.

H. W. Von Willer, freight traffic manager on the Erie, with headquarters at Chicago, has been promoted to assistant to the vice-president, with headquarters at Cleveland, succeeding **George A. Lamb**, who has been appointed assistant general freight agent at Pittsburgh, Pa., relieving **D. R. Thompson**, who has been appoint-

ed freight traffic manager at Chicago, replacing Mr. Von Willer. **W. P. Kromphardt,** division freight agent at Dayton, Ohio, has been promoted to assistant general freight agent at Youngstown, Ohio, succeeding **H. C. Schmidt,** who has been promoted to general eastern freight agent at New York. Mr. Schmidt replaces **E. W. Vail,** who has been appointed general agent at Baltimore, Md. **F. W. Fischer,** division freight agent at Youngstown, has been transferred to Dayton, relieving Mr. Kromphardt, and **C. R. Martin,** general agent at Columbus, Ohio, has been promoted to division freight agent at Youngstown, succeeding Mr. Fischer. **L. J. Burgott,** commercial agent at Newark, N. J., has been promoted to general agent at Columbus, replacing Mr. Martin. **L. E. Newman,** general agent at Albany, N. Y., has been transferred to Minneapolis, Minn., relieving **C. V. Harrow,** who has been promoted to division freight agent at Rochester, N. Y., and **H. G. Cook,** commercial agent at Rochester, has been promoted to general agent at Albany, succeeding Mr. Newman. **R. L. Murphy,** general agent at Cincinnati, Ohio, has been promoted to assistant general freight agent at that point, a change of title.

G. A. MacNamara, general freight agent of the Canadian Pacific, with headquarters at Detroit, Mich., has been transferred to Boston, Mass. **H. W. Hobbs,** New England freight agent at Boston, has retired from active service under the pension rules of the company after 42 years of service. The position of New England freight agent has been abolished. **W. W. Kremer** has been appointed general freight agent at Detroit, to succeed Mr. MacNamara.

SPECIAL

J. Cole Greenway has been appointed regional director of the Eastern-Southern region, Competitive Transportation Research, Association of American Railroads, New York, effective January 1, as reported in the *Railway Age* of December 21. Mr.

J. Cole Greenway

Greenway has been a member of the legal staff of the Railway Express Agency for some 12 years at the executive headquarters at New York. He started his career in the express business as a driver for Wells Fargo & Co. at Jefferson City, Mo., later serving as express agent at various Missouri points. After deciding to study law, he obtained a clerical position in St. Louis, Mo., and entered St. Louis University. The World War intervened and Mr. Greenway entered a training school for officers and qualified for a commission. After being mustered out, he returned to the express service and was subsequently agent at Sedalia, Mo., and Blythesville and Jonesboro, Ark. In April, 1920, he was transferred to the superintendent's office at St. Louis and resumed his legal studies. He secured his LL.B. in June, 1924. After admission to the Missouri Bar, he engaged in general practice in St. Louis and in October, 1928, entered the law department of the American Railway Express Company at New York and continued as attorney when the Railway Express Agency succeeded the predecessor company on March 1, 1929. Mr. Greenway held the latter position until his recent appointment.

Harry Edwin Jones, secretary of the Bureau of Information of the Eastern Railways, with headquarters at New York, has been appointed executive secre-

Harry Edwin Jones

tary, succeeding **Edgar J. McClees,** who has retired. Mr. Jones was born on March 5, 1885, at Ellicott City, Md., and attended the public schools and Strayer's business college, Baltimore, Md. He entered railroad service in April, 1902, with the Baltimore & Ohio as stenographer in the general freight office at Baltimore and in March, 1905, he was transferred to the operating department, where he held various positions in the office of the assistant general manager, general manager and vice-president, until May, 1914, when he became examiner with the Bureau of Information of the Eastern Railways. He held the latter position until February, 1918, when he was appointed assistant chief of the Eastern Region Wage Bureau, United States Railroad Administration. In March, 1920, Mr. Jones returned to the Bureau of Information of the Eastern Railways as chief examiner, which position he held until January, 1923, when he became assistant secretary. He was appointed secretary in March, 1936, the position he held until his recent appointment as executive secretary. On April 29, 1940, Mr. Jones was appointed by Col. Philip B. Fleming, Administrator, Wage & Hour Division, United States Department of Labor, as a representative for the employers on the

Edgar J. McClees

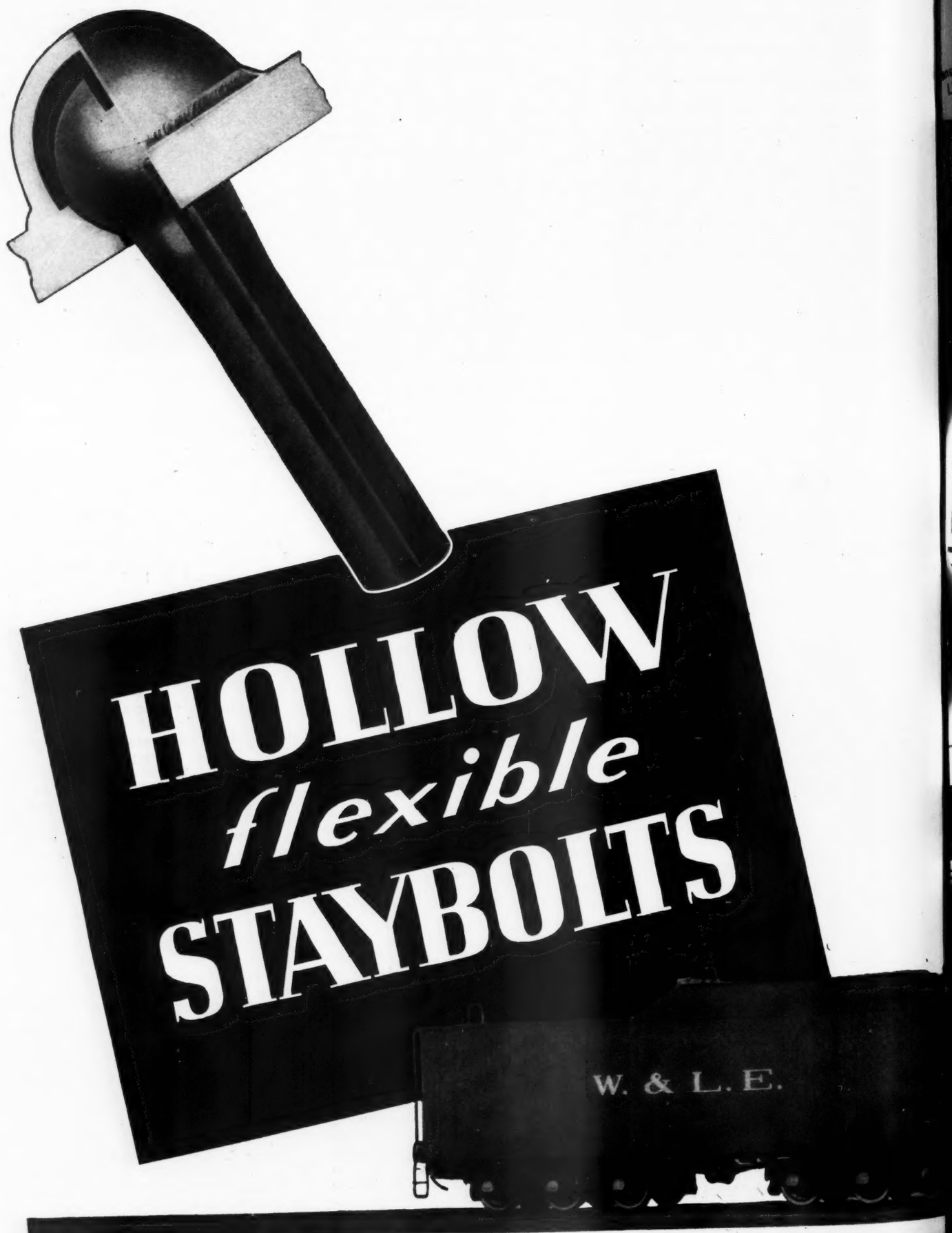
Railroad Carrier Industry Committee (Industry Committee No. 9).

Mr. McClees was born on March 31, 1875, at Philadelphia, Pa., and attended public school in that state. He entered railway service on September 15, 1890, as telegraph operator and extra agent on the Philadelphia division of the Pennsylvania. In 1897 he was appointed telegraph operator in the office of the superintendent at Philadelphia and in 1904 was transferred to the general office of the company. In 1910 Mr. McClees was appointed clerk on wage matters in the office of the superintendent of telegraph, the latter being at that time chairman of the general managers' labor board. In 1912 he was assigned to special duties with the Conference Committee of Managers of Eastern Railroads and in 1914 was advanced to chief clerk of the Bureau of Information of the Eastern Railways. In 1918 Mr. McClees was appointed assistant secretary of the bureau and served also as chief of the wage bureau of the Eastern Region of the Railroad Administration. In 1921 he became secretary of the Bureau of Information of the Eastern Railways and in December, 1922, became executive secretary.

Robert Sommerville, manager of the Jasper Park Lodge, summer resort of the Canadian National in the Canadian Rockies, has been appointed manager of the Hotel Bessborough, Saskatoon, Sask., succeeding **H. W. Aslin,** now in active service as an officer in the Royal Canadian Air Force, and **R. E. Cuhney,** assistant manager and credit manager at the Chateau Laurier, Ottawa, Ont., has been appointed manager of Jasper Park Lodge, replacing Mr. Sommerville.

OBITUARY

Henry J. Horn, railroad analyst and former vice-president of the New York, New Haven & Hartford, died on December 29 at his home in Brookline, Mass., at the age of 76. Mr. Horn retired from the New Haven in 1913 and since that time had been a railroad analyst.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